THE AUTOMOBILE

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Constructing a Jump Spark Coil.

Discussion of the Troubles Due to Defective Coils, for Ignition in Explosion Motors, and Their Remedy in the Adoption of Modern Methods of Construction.

BY GEORGE T. HANCHETT.

ONE of the greatest evils of the jump spark system for ignition purposes in internal combuston engines is the spark coil itself. Many of these are very unsatisfactory. The trouble comes from numerous causes. The vibrator is a frequent source of trouble and adjustment. The coil itself is subject to a possibility of puncturing the insulation, resulting in a marked loss of potential at the secondary terminals or perhaps complete disablement; and every coil gives a reduced potential the faster it is worked. Moreover, many coils are so defective in their insulation that there are more sparks in the interior of their structures than at their terminals, and the design is such that the amount of secondary wire is needlessly large. There is no occasion for the existence of coils of this character built on old-time lines, for the X-ray and wireless telegraphy have caused the induction coil as an instrument to be carefully considered by competent designers and reduced to a commercial basis, where heretofore it has only existed in the form of a laboratory instrument for the purpose of demonstrating beautiful principles.

The existence of so many coils built "like the pictures," and the serious attempts to use these, have induced the writer to believe that a review of more modern methods may be interesting, particularly if the practical illustration be a coil suitable for automobile work.

ERRORS IN DESIGN.

A popular error with reference to induction coils for gas engine ignition is that the secondary must contain a very large amount of very fine wire. It must contain many turns, but it must not be forgotten that an induction coil gives its high potential not because of the fineness of its secondary wire, but in spite of it. Many turns mean high potential, and fine wire can be wound in many turns, but it is the turns and not the gauge of the wire that produce the result. When the requisite number of turns has been provided, the larger the secondary wire can be the better the result. The spark will not be any longer because of the larger wire, but it will be fatter and hotter, and it is more likely to produce the desired ignition. It must not be forgotten that the electromotive force of the secondary has to force its current through the entire secondary circuit, which consists of the resistance of the spark gap, the leads, and the secondary coil itself, and the smaller all of these resistances are, the heavier will be the current and the better the secondary spark. Hence it is desirable to use a short spark gap and as large a wire in the secondary coil as is consistent with the other requirements of the design. A coil designed with these considerations in mind is very much less likely to give trouble at the spark plug due to bridging the gap by deposit. The drawing of a current from the secondary is accompanied by a large reduction of potential at its terminals. If the secondary be of as large wire as is compatible with the conditions, and backed up by a powerful primary, the slight leakages caused by a film of deposit on the plug will be much less likely to reduce the potential to such a point that it will fail to strike across the spark gap.

The best size of secondary wire for a gasoline engine jump spark gap has been found by long experience to be No. 34 Brown & Sharpe gauge. The use of a larger wire will make a coil of the necessary number of turns needlessly bulky, and while it may be of greater current capacity and will therefore give a hotter spark, the result is not a sufficient improvement to justify its use. The use of smaller sizes of wire, 36, 38 or 40, makes the winding of the secondary coil very troublesome and expensive, reduces the bulk of the coil but little, and the heat of the spark materially.

DIMENSIONS OF AUTOMOBILE COIL.

The general dimensions of an induction coil suitable for automobile work are shown in Fig. 1. In this figure it will be noticed that the primary core is of ample size to enable it to absorb a large number of magnetic lines. It is very short because that feature enables the core to quickly demagnetize. The *raison d'etre* for this is that the potential of the secondary terminals is due neither to the amount of current in the primary, nor to the amount of magnetism in the core, but to the rapidity with which the magnetism dies away. Hence it is important to have, first, a core which will demagnetize rapidly, and, second, an interrupter which will break the circuit with exceeding abruptness. If the circuit could be broken instantly and the core were to demagnetize instantly, the secondary electromotive force would be infinite. This is impossible practically, but the nearer it can be approximated, the better the result will be.

Referring to the diagram again, it will be seen that the secondary coil is supported in such a way that it is completely surrounded by a homogeneous insulating material in which there is not the slightest possibility for a crack or aperture of any kind. This is perhaps one of the most important considerations in building a coil. The slightest crack in the insula-

tion of a coil renders that insulation no better than an equivalent amount of air. Hence this insulation is made of melted wax, or, still better, oil, the oil having the very valuable feature that in case the insulation ever punctures, it promptly heals itself again.

It was mentioned a moment ago that if the break of interrupter and the demagnetizing of the coil were sufficiently rapid, the electromotive force would be infinite, and it may happen that one of the many interruptions that the coil is called upon to make is done with exceptional rapidity, due to favorable conditions, causing the potential during this interruption to rise to a very high figure indeed. This momentarily high potential may break down the insulation of the coil and render it useless for further work. Hence the self-healing feature is very valuable. The necessity for homogeneous insulation may be aptly illustrated by the following experiment, which will be instructive to those who care to make it.

If a sheet of hard rubber 1-16 inch in thickness be placed between the terminals of a powerful induction coil, the discharge of the latter will strike around it some three or four inches. If, however, a small hole is drilled in the center of this piece of rubber, it will be found impossible to plug this hole tightly enough to prevent this discharge from striking through it. The hole may be carefully tapped and a hard rubber plug with taper thread screwed in till it wedges. The hole will not be plugged tightly enough to prevent the discharge striking through it until the plug and sheet have been vulcanized together in a homogeneous mass. Hence the insulator employed in the structure of the coil for resisting the high potentials must be homogeneous. The best known insulation will prove no better than an air insulator if it contains the slightest crack or flaw.

Referring again to Fig. 1, it will be noted that the rapidity of demagnetization due to short core has been mentioned. This has a double advantage, for the core can be rapidly magnetized as well as demagnetized, and when high speed engines are used, the time in which the core is to be magnetized is very short, and if it is magnetized only to a small extent, the output of the coil will be correspondingly reduced.

DISTRIBUTION OF WIRES.

Another feature of the coil shown in the figure is the bunching together of the secondary wire in the middle of the primary. This gives results greatly superior to those obtained by distributing the secondary wire all over the length of the core, according to some of the older plans. There are two reasons for this. The maximum difference of potential between primary and secondary is reduced because by the arrangement recommended and the points in the secondary coil which have the largest difference of potential between them are widely separated from the primary core, so that there is less danger of striking between the primary and secondary. In the second place, and more important, it must be remembered that every turn of the secondary coil is in series with its fellows, and therefore the electromotive force in each of these turns must be so timed as to occur simultaneously so they will add together and produce a long spark at the terminals. The duration of this pulse of electromotive force is exceedingly brief and the slightest difference in the time of occurrence of this pulse of electromotive force in the various turns of the secondary results in the failure of the simultaneous occurrence of the maxima and a reduced length of spark. It is a fact that coils placed near the end of the core occupy what is known as the stray field of the same, and the most rapid variation of the stray field does not occur at the same instant as does the most rapid variation of the magnetism in the center of the core. The difference is microscopically small, but is sufficient to materially affect the result. This can be practically demonstrated by the following experiment: If an induction coil be made with two secondaries which are movable with reference to each other, and one of these be placed

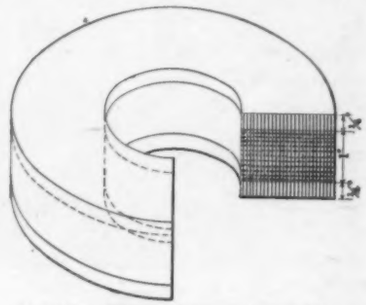


FIG. 3.—THE SECONDARY COIL.

at the center and the other at the end of the primary core, it will be found when they were properly connected in series that a certain length of spark can be obtained. If these two secondaries are now moved together so that they both occupy

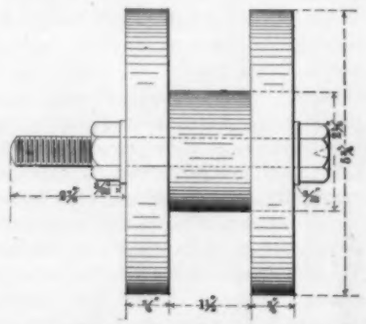


FIG. 2.—WINDING DEVICE FOR SECONDARY COIL.

a central position, the secondary spark will be considerably longer than before.

Two secondaries placed at the ends of the coil where they are both in a stray field will act together, and coils are sometimes built that way, but a coil in the center of the car will not co-operate with one at the end to good advantage.

Having briefly outlined the reasons for the dimensions of the coil, which are somewhat of a departure from the conventional plans, it will be interesting to

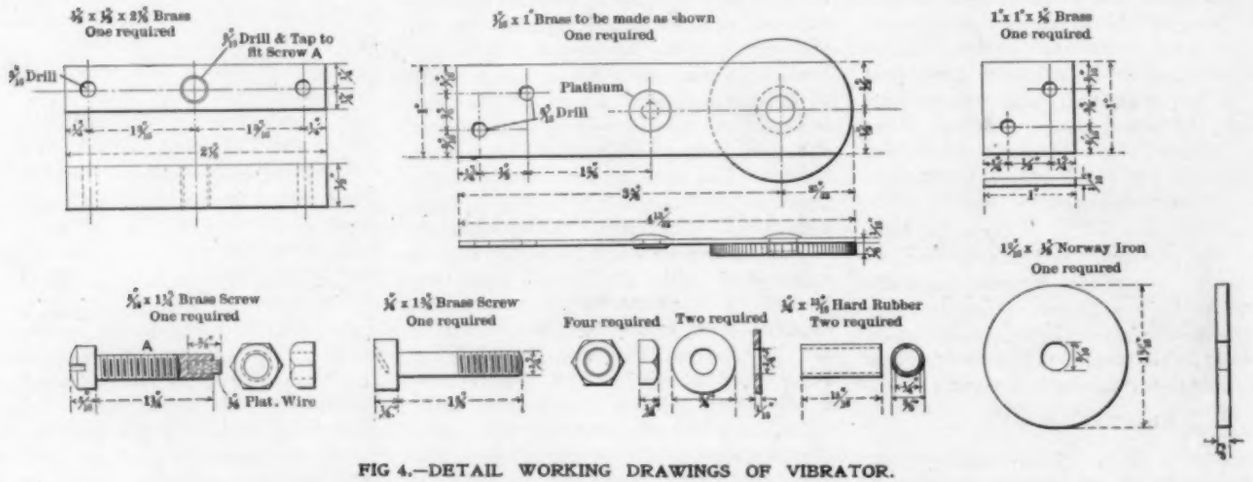


FIG 4.—DETAIL WORKING DRAWINGS OF VIBRATOR.

consider the methods of construction employed.

INSULATION OF SECONDARY COILS.

By far the most important part of the work is the winding and insulation of the secondary. This should be wound of No. 34 wire, preferably bare, separating adjacent turns by winding between them a cotton thread. If the winder is not sufficiently skilful to do this, he may use double cotton covered wire, but he will find that he will be able to get less layers in the given space. The secondary coil should be wound upon a wooden form from which it can subsequently be removed for further insulation and treatment. A suitable form is shown in Fig. 2. It can be conveniently mounted in a lathe and is easily made with an ordinary bolt and a few carpenter's tools. The insulation between the layers is to be made of the thinnest pure white unsized paper, that is to say blotting paper; 0.025 of an inch is a suitable thickness. This is not a homogeneous insulation, but when the whole structure is thoroughly soaked with hot wax, it will become so. The strips of blotting paper are to be at least 1-2 an inch wider than the width of the coil winding. Fig. 3 illustrates this feature, the reason for which is apparent when it is considered that if the layer were wound clear to the end of the paper there would be a very great possibility of the windings dropping down onto the layer below, thereby short-circuiting and cutting out the layer. Beside this it must be remembered that while the voltage between adjacent turns is very small and can be insulated by a well soaked cotton thread, the voltage between layers is as many times greater as there are turns in the layer, probably at least 100 times greater, and consequently correspondingly greater care is required in insulating the layers from one another. The completed coil is conveniently secured together with very thin pure white silk tape. This tape must not be heavily laid on. It is placed there simply for the purpose of holding the structure together for convenience in handling, and must on no account seal the coil so tightly as to exclude the melted wax with which it is presently to be treated. Therefore a comparatively small number of turns of tape evenly spaced around the coil is amply sufficient. The joints in the coil, if there be any, should be soldered, not so much because of the necessity of low resistance in them as because the oil or wax may work in between, and even though it breaks down under the pressure and thereby restores continuity, a carbonization is produced at that point which may spread. The terminals of the secondary coil are of course very delicate, and should be brought out with flexible wire of a larger size. For this purpose the flexible wire should be bare or insulated only with white cotton. Rubber covered flexibles are not to be used, and flexible cord covered with jute soaked in asphaltic compound and covered with bright colored silk is worse still. Coloring matter of any kind is to be distrusted. The flexible terminals can be conveniently locked in place by means of twisting them around silk tape.

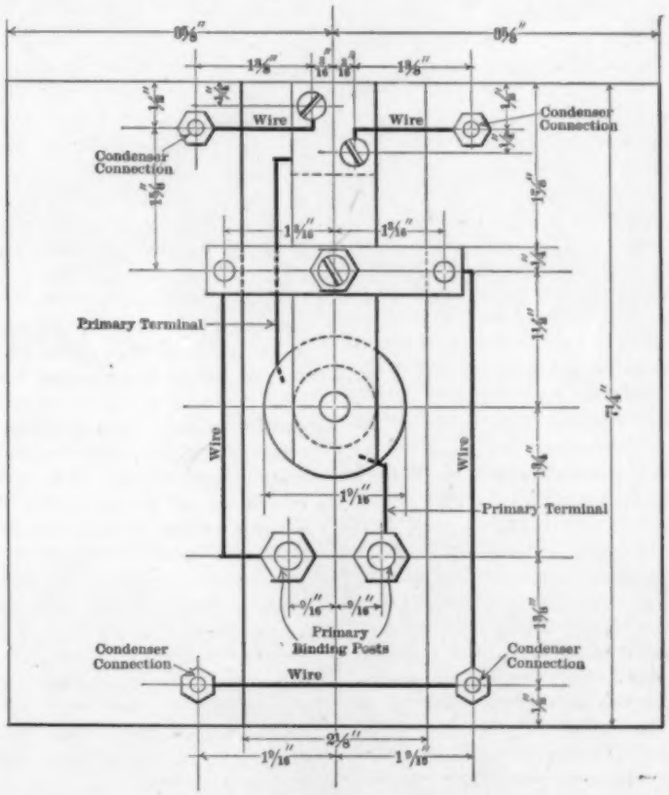


FIG. 5.—CONNECTIONS OF VIBRATOR AND POSITION ON TOP OF BOX.

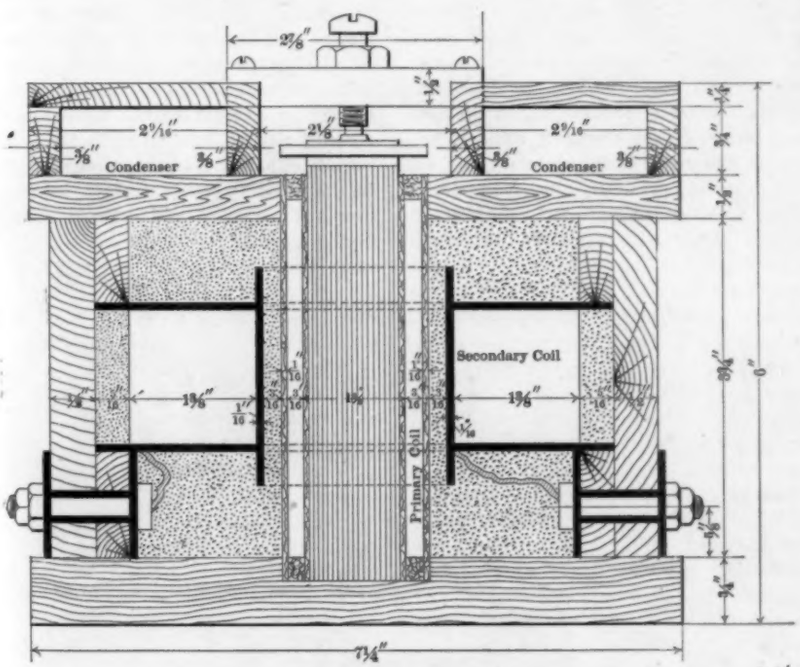


FIG. 1.—GENERAL DIMENSIONS OF INDUCTION COIL.

INSULATING THE COIL.

The next step is the impregnation of the coil with its homogeneous insulation. A pure white paraffine wax is very good for this work. The wax should be melted in a common saucepan and brought almost to the boiling point, and the coil should be placed therein and allowed to remain until there is not the slightest sign

of an air bubble proceeding therefrom. This is a matter not of minutes but of hours. It takes a long time for the wax to thoroughly soak into the coil and displace all the air. When the coil has been in the wax a sufficient time, the heat should be turned off and the wax allowed to cool. As soon as the wax is sufficiently cooled so that it is of a slushy consistency and adheres thickly to any object thrust into it, the coil should be lifted out and laid on its side upon a plate of glass. Another plate of glass should be immediately placed upon it and weights applied to the extent of six or eight pounds, and the wax allowed to harden in this condition. The whole structure should be covered with a cloth and left thus until the primary box and core are ready for its reception. In this way the introduction of dust and foreign materials will be avoided.

The box in which the coil is to be placed may be made of 1-2-inch pine well shellacked and put together with brass screws. The joints in this box should be very close and tight and should be heavily shellacked before putting them together. The interior of the box should be given several coats of shellac, one being allowed to dry before the next is applied, and a sufficient number of coats should be given to make the box thoroughly liquid tight. The bottom of the box is preferably made of 3-4-inch stuff so as to receive a circular mortise made with a Faustner augur bit, to receive the end of the primary. The primary core is made of fiber tube, one inch in internal diameter and filled with soft straight iron wires not larger than No. 20 B & S. In filling this core tube it is wise to use as many wires as possible, and it will be surprising to the manipulator to see how many additional wires he can get in after the tube is apparently full. The greater the number of wires the better the result. Both ends of this tube carry a tight fiber collar as shown in the section. The whole is placed in a lathe, preferably in the jaws of a chuck, and carefully wound with two layers of double cotton covered wire No. 14, Brown & Sharpe gauge. The terminals of this wire are also preferably brought out with carefully soldered flexibles and secured to binding posts in the cover. The primary coil is then covered with a thin fiber tube slipped over the collars, and the whole is tightly driven into the hole in the box cover, thereby securely holding it.

Thus the cover and primary coil, condenser, and vibrator form one unit, and if it is ever desired to take the coil apart, the primary and its circuits are removable without disturbing the secondary. The parts of a suitable vibrator are shown in Fig. 4, and can be made by any machinist by carefully following the drawings. The connections of the vibrator and its mounted position on top of the box cover are shown in Fig. 5.

A small hole should be tapped in the box cover and sealed with a suitable screw plug, preferably of hard rubber. This hole is for the subsequent introduction of the insulation of the coil.

MOUNTING THE SECONDARY COIL.

The secondary coil is mounted in the box, and this is a matter of great care. Two square sheets of hard rubber are provided, 1-16 of an inch thick, which will slip easily into the box, and these are mounted on a short piece of hard rubber tube of the dimensions shown in the drawing, and fit tightly thereon, thus forming the mount for the secondary coil. When the mount is complete, the secondary coil may be removed from its glass plates, and the surplus wax in the hole gently pared off so that it will slip on the tube. The rubber sheets should be immediately applied and the secondary coil may then be placed in the box on the supporting pieces, which are of wood, and should be secured in position by wooden pegs, which, however, are not sufficiently long to perforate the sides of the box. The secondary terminals are to be brought out on the upper side of the secondary coil to suitable binding posts as shown in the figure. The coil may now be put together and the insulation introduced. Concerning the proper insulation, it is a matter of some doubt. From a dielectric point of view, oil is unquestionably the best on account of its self-healing properties. It is, however, sloppy and fussy, and is very apt to leak through the joints of the box, no matter how carefully these be made, thereby accumulating dirt and requiring renewal. Hot paraffine wax, on the other hand, while there is a remote possibility of puncture, answers very well and has none of these objections. If oil is to be used, it may be simply poured into the box until it appears at the orifice, a light paraffine oil being most suitable. If, however, wax is to be used, another plan should be adopted. The wax should be heated to the boiling point in a clean saucepan, and poured into the coil, which should be immediately transferred to a baking oven. The oven of a gas or kerosene stove properly regulated will answer admirably. The temperature of the oven should be kept just below that of boiling water. It will be soon found that the level of the wax in the coil is much lower than it was when the coil was first placed in the oven, and the deficit should be made up until by no possible device of heating can any more wax be introduced. The fire should be turned off from the oven, when it will be found that the wax in cooling is inclined to shrink, and this deficit also should be made up from time to time. After the coil is thoroughly cooled, the plug may be screwed in place and it is ready for use.

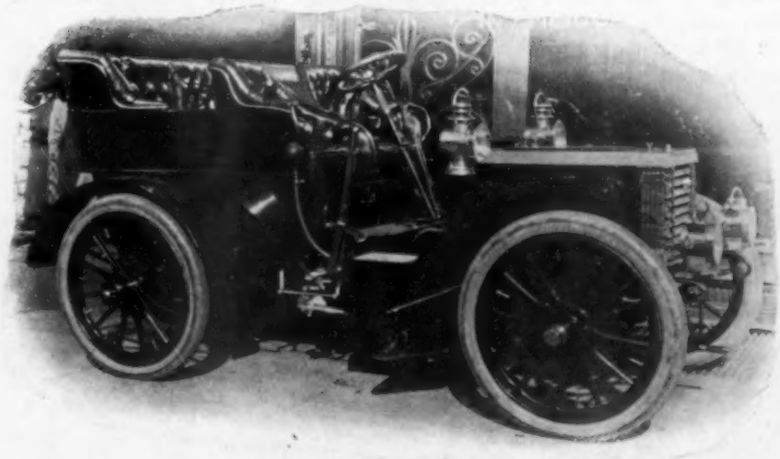
The condenser of this coil is mounted on the cover in two separate boxes, the compartment between them being reserved for the vibrator. A hinged cover may be provided to protect the vibrator pocket from dirt and dust, which is one of the most fruitful sources of vibrator troubles. The condenser is best made of sheets of tin foil and paraffine paper. The paper should be about 3-1000 of an inch in thickness and cut to strips the exact width of the box which is intended to contain the condenser, and 1-2 an inch shorter than the length of the box in order to allow space for the sheets of tin foil appearing at the ends. The strips of the foil should be 1-2 an inch narrower and 1-2 an inch longer than the strips of paper between them.

BUILDING THE CONDENSER.

The condenser is built up in the following way: The paraffined paper is carefully prepared, and when ready one strip is laid on a flat board and upon it is laid a tin foil strip in such a way that a 1-4-inch margin appears on three sides, the end of the strip projecting for convenience in connecting thereto. A second sheet of paraffined paper is immediately laid on top and a momentary pressure with a warm flat iron will lock the three sheets together so that they will not become disarranged as the assembly proceeds. The next sheet of tin foil should be laid so that its end projects on the end opposite, and another piece of paraffined paper should be applied and locked in the same way. Thus the operation proceeds until the condenser is built up to the required thickness, when the whole structure should be placed between two solid blocks of wood held together with heavy screws and placed in a baking oven and brought to the temperature of melted paraffine. When taken out and allowed to cool, the condenser can be readily handled without coming apart. The tin foil strips projecting on either end of the condenser should be bunched together tightly in the bottom of the box in which the condenser is finally to rest, and secured thereto by a light brass strip with two small screws. To this brass strip the wire may be soldered and brought up to the binding posts on the cover of the condenser box. The connections are indicated in the drawings. The binding posts on the top of the coil can most conveniently be bought, but care should be taken to select the nut type of binding posts, provided also with a lock nut so that the wire once in place can be so tightly secured that there is no possibility of its jarring loose. Four dry cells weighing 2 pounds each, connected in series, will make a good primary exciting source for this coil.

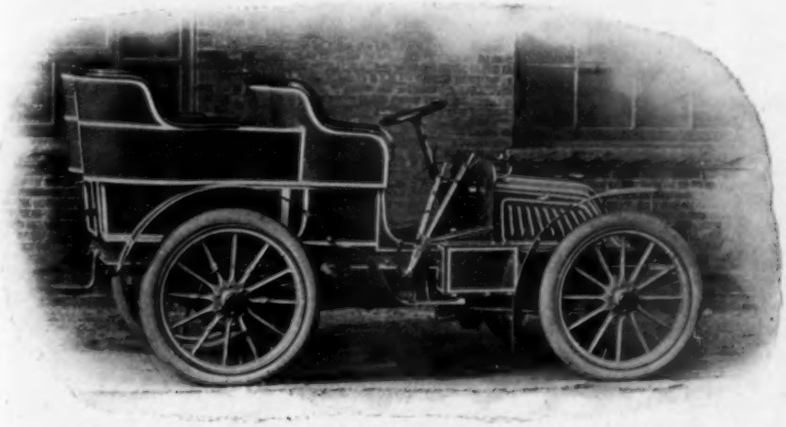
In the case of a multiple cylinder engine, several of these coils can be placed in a single long box. No partitions between will be needed. Each coil is then

preferably equipped with its own battery, but can of course be equipped with a battery of heavier cells which are connected in common to one terminal of the coil, while the other battery terminal is applied to the free terminals of the coils in the proper order by a suitable commutator. Particular attention is called to the substantial character of the platinum contact of the vibrator. The vibrator on the coil is one of its weakest points, and a prolific source of trouble is the use of platinum points that are too small. The vibrator contact has by far the highest resistance of any part of the primary circuit, and if the points are small, they are more susceptible to troubles from dirt and dust, and moreover, they rapidly wear away, thereby changing the adjustment of the vibrator, which then requires attention. It is also to be noted that the vibrator part is fairly massive. It is, however, intended to have a stiff spring of phosphor bronze, thereby giving it a high period of vibration, this construction being permissible on account of the powerful magnetism of the liberally dimensioned primary core, which is thereby enabled to actuate it promptly. This coil will be found to be bulkier than the average coil used for automobile work. It will, however, not be much heavier, and its reliable performance will more than offset these disadvantages. It should give in free air a spark not less than 1 inch in length if properly built, and when the spark is shortened to the length commonly employed in gasoline engine work, it will be found to be very calorific and to reliably ignite the charge.



STANDARD REGULAR TONNEAU BODY CAR—See page 296.

KING OF THE BELGIANS BODY CAR—See page 296.



STANDARD DETACHABLE TONNEAU BODY CAR—See page 296.

LOCATION OF COIL IN MACHINE.

In the installation of the coil it should be so located that the secondary wire run from the coil to the spark plug should be as short as possible, and every inch of its length should be so arranged as to be readily inspected. A very heavy rubber covered flexible No. 14 wire is the best to use for secondary wiring. It should be bought from some reliable wire maker and the use for which it is intended should be specified. The average rubber covered wire found on the market in the supply houses will not be satisfactory. This wire should not be allowed to touch any part

of the wood or metal work on the machine, its insulation being as far as possible an air line, but wherever it is supported, porcelain cleats should be employed. The run should be so short that only one or two cleats should be necessary.

In the construction of this apparatus careful attention to the details as outlined in the foregoing is even more important than following the scale dimensions, although both should be scrupulously observed.

There will be required for the construction of this coil the following material:

One and one-half pounds of No. 34 copper wire, bare or insulated, or double cotton covered as may be desired.

Three-quarter pound of No. 14 double cotton covered copper wire.

White pine lumber, 1 piece, 7 1-4 in. x 3-4 in. x 7 1-4 in.; top.

White pine lumber, 1 piece, 7 1-4 in. x 1-2 in. x 7 1-4 in.; bottom.

White pine lumber, 1 piece, 3 3-4 in. x 1-2 in. x 26 in.; sides.

White pine lumber, 1 piece, 7-8 in. x 3-8 in. x 22 in.; white pine lumber, 1 piece, 1 3-16 in. x 3-8 in. x 22 in.; inside strips.

White pine lumber, 1 piece, 1 in. x 3-8 in. x 11 in.; white pine lumber, 1 piece, 3-4 in. x 3-8 in. x 29 in.; white pine lumber, 1 piece, 2 9-16 in. x 1-4 in. x 15 in.; boxes for condenser.

One pint of brown shellac for varnishing box inside and outside.

Hard rubber and brass work as per drawing.

One pound of soft iron wire, No. 20.

Three and one-half pounds paraffine wax.

Styles in Tonneau Type Bodies.

Question frequently arises as to the names of the different styles of bodies used on touring cars, which are becoming more and more popular. For the benefit of the uninitiated, three styles of bodies are shown herewith, giving a clear idea of the principal types made by American automobile builders of the French style of car.

First, is shown a 35 horse power Peerless chassis, fitted with a double roll King of the Belgians body, with divided front seats. This style is made is three sizes and is considered by many one of the most handsome and comfortable bodies that can be made. It is known in the language of the trade as the double roll, King of the Belgians, large.

The 20-horse power Peerless chassis is fitted with a Standard Regular Tonneau with divided front seats. The seats are very substantial and servicable and are fitted with a pocket between them which may be used as a receptacle for small articles. This is one of the strongest bodies which can be built, and is especially desirable for a long trip. It is called the standard regular tonneau with divided front seat.

A desirable body for drivers who are looking for high speed is the third shown herewith known as the Standard Detachable Tonneau, which is fitted on a 15 horse power American C. G. V. chassis. This tonneau may be removed from the chassis and a tool box attached in its place. The double white line near the front of the back wheel shows where the tonneau is attached. Photographic reproductions of the three types will be found on the preceding page.

RULES GOVERNING THE PARIS-MADRID RACING DIVISION.

For the Paris-Madrid race 123 formal entries had been received until February 10. Between February 10 and 15 the number was nearly doubled. The list remains open until April 15, whereafter double entry fees are charged until the final closing on May 15.

The regulations governing the racing section of this event were published as soon as the sanction of the race by the French Government had been obtained. Among the most important provisions are the following:

There will be four categories, viz: 1—cars weighing from 650 to 1,000 kilogs.; 2—400 to 650 kilogs.; 3—250 to 400 kilogs.; 4—50 kilogs. and under. Cat. 1 and 2 must convey during the entire run a member of the A. C. de France, of the Spanish Club, or one of the recognized clubs. The order of starting on the first day at two-minute intervals will be determined by ballot. On the second day vehicles will start in the order of their arrival the previous day. At the end of the second stage a provisional classing of the first five vehicles since the start from Paris will be made, and the order of running on the last day will be (1) for the first five cars at intervals according to the provisional classing ranging from two minutes up to a maximum of fifteen minutes. The rest of the vehicles will, as before, be sent off in the order of arrival the previous night, at intervals of two minutes. The "parcs" or daily stopping depots will be strictly closed to all persons except certain officials. Upon the arrival of the cars two minutes will be the maximum time allowed for attention to the vehicle. Cleansing of gasoline motor cylinders and blowing off steam in steam cars are the only acts allowed. Next morning, upon the word to start being given, the time will be booked against each vehicle, which must at once proceed outside the garage or be pushed out, and any time taken in oiling, repairs, etc., will be debited to the running time of the competitor. A special and novel official box will be supplied to each competitor at 10 fr. for the safe carrying of the official time sheets, etc., the fee being returned upon the return of the box to the A. C. de France after the event. The order of starting will be balloted for on February 16 by all applicants up to February 15, after that date all applicants will start in the order of their entry. The entry fees are: Category 1, 400 fr.; Category 2, 300 fr.; Category 3, 200 fr.; Category 4, 50 fr.

In addition to entries by individuals, groups of vehicles can also be entered or designated for a special classing, that is, each maker may notify in each category a group of four cars of their make, notice of such group having to be given by May 20, after which date no change in the grouping of the cars will be allowed. The nomination of one group only from each maker in each category will be permitted. These groups will be ultimately classed as follows:—Group 1, 4 vehicles arriving out of 4. Group 2, 3 vehicles arriving out of 4. Group 3, 2 vehicles out of 4. Group 4, 1 vehicle out of 4. In Group 1 the classing will be determined by the total times of the four vehicles. In the other groups the classing will be determined by the total distances run by the various cars of each group. Outside assistance to competitors will not be allowed either by means of special repair vehicles, or by friends. All repairs, etc., must be effected by the mechanician and those on board the car. Traversing the course before the race at a speed exceeding the legal limits may entail disqualification. All protests must be lodged within four days of the arrival of the first vehicle at Madrid. The special Commissioners for France are: Prince d'Arenberg, M. H. Huet, and Count de Vogue. For Spain: the Duke d'Arion, M. L. de Errazu, and M. Quinones de Leon. It is obligatory on all competing cars that they should be on view for two days at the Exhibition in Madrid which will be organized by the Spanish Club.

As usual with the long distance races in Europe, the event will include a slow, or touring, section.

The route and the stages for the tourist section of the Paris-Madrid are announced as follows:—

In France:—1st day, Paris-Pougues; 2nd day, to Royat; 3rd day, Viaduc de Garabit-Murat-Vic-sur-Cero; 4th day, Rocamadour or Alvignac; 5th day, Cahors-Agen; 6th day, Biarritz-Saint-Sebastien; 7th day, no traveling.

In Spain:—1st day, Saint Sebastien-Zaraus, Bilbao; 2nd day, Vittoria; 3rd day, Miranda del Ebro, Burgos; 4th day, Venta de Banos, Valladolid; 5th day, Salamanca; 6th day, Avila, Madrid.

The start will be on May 12, and a silver medal will be awarded to every vehicle arriving in Madrid. Entrance fee 200 francs.

Moses Fifield has been elected assistant secretary of the Rhode Island Automobile Club of Providence, R. I., in place of Benjamin S. Clark, resigned.

EXPERIMENT IN STEAM OMNIBUS SERVICE.

An experiment now being tried at Westerly, Rhode Island, in the way of operating five steam carriages for public use is of considerable interest, as it will do something toward showing what can really be done with automobiles in the way of carrying passengers and delivering parcels for hire.

A great many persons have held the opinion that automobiles might be made to pay, when running in opposition to trolley lines in streets where travel is heavy and the trolley cars are crowded, and it has often been asserted that rural centers, not quite densely enough populated to warrant the installation of a trolley line, might be well and profitably served by automobiles, which are free of the streets and have no costly power houses to put up, and neither right of way nor tracks to pay for, and can travel anywhere they are wanted to go.

No automobiles have yet been tried against trolleys, and while trolley riding in the rush hours in our large towns is not a pleasure, and a great many persons would be glad to pay for seats in any vehicle that would take them to their work in good time, there seems little prospect that enough automobiles to fairly try conclusions with any city trolley line will be placed in service very soon anywhere. A large trolley car can carry a hundred passengers when crowded as it is the custom to crowd them, while an automobile to carry twenty passengers must be a large and heavy vehicle, even larger than is convenient for use on the street surface. Probably 12 or 15 passengers is as many as would be found suitable for automobiles for public use, and so many vehicles would be required to handle the overflow from a hard worked trolley line that there would be no room on the street for them.

FRONT VIEW OF STEAM BUS NOW IN SERVICE AT WESTERLY, R. I.

PUBLIC BUS ORIGINALLY BUILT FOR SERVICE IN PORTO RICO.

There was a brief trial of "Mobile" steam wagons, to carry about 8 passengers each, between Cortlandt and Wall Street Ferries, in New York City, but the service was not long continued, and must be supposed not to have been profiatble.

There have been rumors of public trolley service at various localities, as at Oyster Bay last summer, but no real attempt to use so many as five steam wagons in one vicinity by one company for public hire has been made before this trial at Westerly, in the United States, so far as known to the writer.

These five carriages, three steam omnibuses and two steam parcels delivery wagons were built at Providence, R. I., to work on the Island of Porto Rico, where there is a good, but narrow macadam road 80 miles long, between San Juan on the east and Ponce on the west. A stage fare of $18 per passenger for a single trip seemed to promise a profitable business. Like all West Indian islands, Porto Rico is high in the middle, and this road, besides being only about 10 feet wide in some places, has some grades as high as 16 per cent., but as there was a considerable traffic between Ponce and San Juan, capital was found to build these five steam wagons, and they were sent out to Porto Rico and tried at $7.50 single fare rate for the 80 miles, and could not be made to pay, and so the wagons were brought back to Providence and laid up for a lawsuit to be fought out over the venture; and finally they were put at work at Westerly, on the Pawcatuck River, which divides Connecticut from Rhode Island.

Westerly is a straggling collection of villages strung along the little Pawcatuck Mill River for about five miles, with a total population of about 13,000, busy streets morning, noon and night, and a rural quiet through the remainder of the day.

Several textile mills, and the Cottrell Printing Press shops, 400 hands, furnish employment to the population, and the town has two Sundays in each week and supports a daily paper which is printed on all days but Saturdays, which the numerous Westerly Seventh Day Baptists observe as the Sabbath.

There are no well defined lines of travel in Westerly, and there is no trolley service except in summer, when a line is operated between Westerly and Watch Hill, a well-known summer resort on the Sound, five or six miles from Westerly Post Office. Two bridges, about three-fourths of a mile apart, span the Pawcatuck; and the post office, principal hotel, the banks and the Wilcox Memorial Library, cluster about a little triangular plaza, which is the business center.

The illustrations show the steam omnibuses, which are heavy, weighing 5,500 pounds each, tanks filled, carry 90 gallons of water, equal to about 18 miles run, and 20 gallons of gasoline. Artillery wheels and solid rubber tires are used, the boilers are vertical, and the vertical engines, "Baldwin's" link reversing, have a pair of cylinders, 3 by 6 inches stroke. The delivery wagons are lighter and weigh about 2,600 pounds, ready to work, and are driven by pairs of engines 3 inches bore by 4 inches stroke, made by Fitz Henry, of Boston. The boiler draft is vertical and upward, and the fuel is gasoline. Kerosene was intended to be burned, but the boilers would not make steam with it. The omnibuses have wheels 40 and 36 inches, and the delivery wagon wheels are 36 and 32 inches diameter, with solid tires. Wheel steering is used, and it is intended to have the drivers collect the fares, though there are now two men, a driver and a conductor, on each vehicle. The passenger fare is 5 cents, and the parcels delivery rates are the same as by horse-drawn wagons. No attempt is made to handle the "rush hour" business.

The omnibuses can carry fifteen passengers inside, six on a side and three on a cross seat over the boiler, and three more in front with the driver. The engines and boiler and the driver's footboard take up about a third of the vehicle length.

As these wagons have only been running a short time, nothing can be foretold as to results. They have paid expenses on some days, and the public seems to like them. All of these runs are short, none over two miles.

This venture has so far cost a lot of money, as the Porto Rico transportation built its own wagons, did some experimenting, sent its wagons out to the island and brought them back and had a lawsuit over them. Probably somebody has paid out at least $75,000 in the affair from first to last.

Comparison Between British and French Industries.

Fallacious Claims for Crystal Palace Show—A Bluff Nailed—Britons Boldly Disregard Established Design Saying It Leads No Farther—The Need of Types Rather Than One.

Staff Correspondence.

PARIS, Feb. 24.—Every show is naturally bigger than those that have preceded it if only you want to make it larger, for it is always possible to claim some superiority either in the area of the building, the size of the stands, the number of vehicles, the attendance, the gorgeousness of the catalogue, the tariff for refreshments or the price of admission. At the Crystal Palace show the promoters made an introductory comparison in the catalogue between their display and the Paris Salon de l'Automobile which might have been taken as a humorous vein of fancy if it were not supported by cold-blooded statistics alleging to give the area covered by the stands at the two shows. The Crystal Palace show, of course, comes out triumphant, and the newspaper men have been taking the statements from the catalogue and cabling to all parts of the world that the show is the greatest that has ever been organized.

Of course the Crystal Palace is a bigger building than the Grand Palais. But it is carrying comparison a little too far to say that because the building has a larger area therefore the show is bigger. As a matter of fact it was nothing of the kind. It is quite possible that the stands in the London show covered more ground than they did in Paris, but I very much doubt it if we include the annexes at the Grand Palais, but it should be remembered that while the French exhibitors could get nothing like the space they asked for, the British firms were given all they required. Some of them even had three or four stands apiece. The maker in Paris could not show more than half a dozen vehicles, and most of them still less, but the British exhibitor was able to display all his various types of cars and there was still plenty of room to move about on his stand.

The true test is to take the number of manufacturers exhibiting at the two shows. At the Crystal Palace there were 185 firms, and in Paris close on 800. The London show sinks by comparison, and to say that it was bigger than the Salon is to give expression to views that are wilfully misleading.

LIMIT OF FRENCH TYPES REACHED.

The show was nevertheless much more interesting than might have been expected. As an object lesson in automobile construction its importance was not in proportion to its size, as there was little attempt at following up existing practices and improving upon them, but it was very interesting as showing the direction in which British makers are seeking to produce a characteristic type of car. They refuse to copy the foreign vehicles in any shape or form, but whether this independent spirit is to be commended or not it is really difficult to say. Any definite pronouncement on this point depends upon whether the French vehicles are really the best that it is possible to construct, that is to say, whether they are being developed on lines which will lead to the greatest perfection. Seeing the difficulty the French have in making further progress their British competitors say that the Gauls have about got to the limit of invention in the standard types of cars, and that if a more satisfactory system of vehicle is to be produced it must be evolved on different lines.

The somewhat ostentatious way in which the British refuse to accept foreign improvements is a little peculiar. With only a few exceptions they will have nothing to do with mechanical inlet valves. No one can say that they are in the wrong, because with the improvements carried out in carbureters it is by no means certain that the mechanical inlet valve is indispensable, but, as the foreign makers have had a much greater experience in automobile construction, they might be credited with knowing more about the matter than firms who have only recently entered the trade. No one can lay down hard and fast rules respecting mechanical valves or any other feature of construction, since the automobile is still so far from absolute perfection that there is no telling what changes may be suggested by further experience in the future.

NOTHING TO GAIN BY IMITATION.

In a general way the British firms prefer to develop the motor vehicle in their own way instead of following the practices of other countries. To a certain extent they are certainly warranted in doing so, though it will mean an enormous expense in the building of experimental cars and probably serious disappointments and heavy financial losses before they can turn out just the sort of cars required by the public. They are prepared to run these risks because they think, in the first place, they have nothing to gain in competing with the foreigners in their own

special types of cars, and again they are of the opinion that these cars are not altogether suited to the British market, which needs a much greater variety of vehicles than can be satisfactorily turned out by means of the few systems that have become the standard of construction abroad.

Differing from the requirements of Continental users, who place speed and up-to-dateness before anything else, the British look particularly to economy, convenience and reliability. The question is whether these necessities are to be met by vehicles all built upon very similar lines, as is the case on the Continent, or whether each requirement is to be fulfilled by a special type of vehicle, that is to say, whether certain systems of propulsion will be found preferable for vehicles running under particular conditions. To take two extreme cases we have the high class touring car and the cheap carriage for two persons which can be bought for $700. Of course the latter cannot be built upon the same lines as the big touring car. It is constructed with the fewest number of parts possible so as to reduce the cost of manufacture.

It will be interesting to see if these extreme cases can apply to intermediate requirements, because if so the British are no doubt right in going to the expense and running the risk of building all sorts of experimental vehicles in the hope of meeting the needs of such a variety of customers as the professional man, the commercial traveler, the tradesman and the average buyer, who cannot afford to spend much money on a car for the pleasure of himself and family.

NEW BRITISH LIKE OLD FRENCH CARS.

At the same time it must be confessed that the position they are now taking in the industry does not compare favorably with that already attained by their foreign competitors. They are going over ground that has been covered long ago by the French firms, and the majority of the exhibits at the Crystal Palace were strikingly reminiscent of those seen at all the Paris Salons up to two or three years ago. There were horizontal motors and belt transmissions galore, armored wood frames and tubular frames, friction clutches of the old pattern and motors with automatic induction valves. An inspection of the exhibits would lead one to suppose that the majority of the British makers knew nothing of what had been done in the past and had never even seen an up-to-date French car.

We do not say that the British manufacturers are wrong in testing all the old devices themselves and inventing many new and ingenious ones of their own, and it is probable that they will turn some of them to better account than the French, who have perhaps been too blindly following their leaders, but at the same time, even if they succeed in turning out characteristic types of vehicles suitable for all classes of British buyers, it will take them a long while to gain the position they are striving for. So far as could be judged from a general estimate of the Palace show they are at present at least two years behind the French. that is to say, taking them as a whole. Nevertheless, there is a good deal that is promising in the cars exhibited, and if makers evolve a variety of types of thoroughly satisfactory propelling mechanisms, instead of confining themselves to one or two, they will go rapidly ahead. Their advantage lies in the independence of the British user, who will buy anything that suits him, without asking himself whether it is up-to-date or in the fashion, and in this respect there seems to be a wider field for practical automobile invention in England than on the Continent.

H. J. Dietz, a lamp manufacturer, used his four horse power Oldsmobile to run a pump on his farm at Hempstead, L. I., for 15 days in February. During this time it pumped 500 gallons of water a day besides carrying its owner on frequent trips to New York City. Early in February the gasoline engine which usually runs the pump broke down, and to avert a water famine, the little automobile was raised on two boxes, leaving its wheels clear of the ground. The belt to the driving wheel of the pump was placed around one of the wheels of the car and the machinery was started. The automobile was used in this way about 20 minutes each day during the 15 days while the gasoline engine was being repaired. And Mr. Dietz says that one day, after performing its unusual task, he drove the automobile to New York, a distance of 22 miles, in 55 minutes.

Correspondence

Prospective Buyer's Troubles.

Editor THE AUTOMOBILE:

Sir:—I want to buy a gasoline runabout. I understand that sometimes they are hard to start, as I have noticed this in different makes. Is that a trick of all the gasoline kind, or due to lack of knowledge on the part of the driver? In the hands of an experienced man, does one ever have to walk home, by reason of the engine getting cranky, or do you have to wait a long time occasionally to get it started.

R. L.

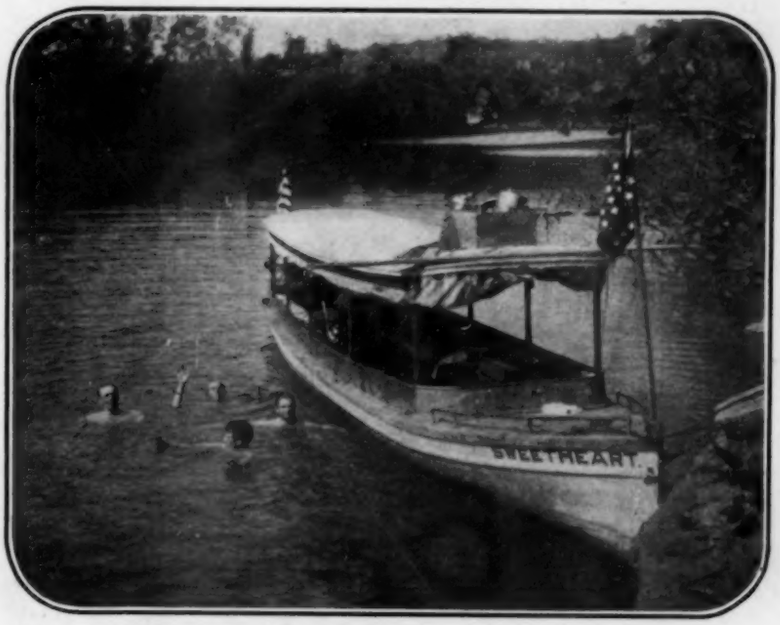
Kentucky.

[Many owners do not trouble themselves to know exactly how their machine works and they have all sorts of trouble in consequence on the road and off. It is quite within the range of possibility that a man might have to walk home who started out in an automobile, but as you well know, the very same thing applies to any one who might go out with a horse and wagon. The horse might fall dead, or run away, or step in a hole and break its leg. Such things are possible; and so with any mechanical apparatus, there is always a possibility that some breakdown may occur, but care in the operation and maintenance of an automobile should practically safeguard the owner against unpleasant experiences of this sort.—Ed.]

Motor Boat Experiences.

Editor THE AUTOMOBILE:

Sir:—Having been requested by you to give some of my experiences cruising on the Ohio River, I take pleasure in telling of an eleven days' trip which I made on



MOTOR BOAT "SWEETHEART" ON THE OHIO RIVER.

my launch *Sweetheart*, accompanied by five of my friends.

We left last season for a trip from Owensboro, Kentucky, to the head waters of the Kentucky River. The first day out we ran from six A. M. until 5 P. M., when we stopped on a fine rocky beach. There we enjoyed a most beautiful sunset, and afterward a supper which was eaten with a relish known only to the lover of open air sports, and which was prepared principally by the use of a plumber's gasoline blast furnace (which is infinitely superior to any stove that I have seen for use in the open air or on a boat). The moon having come up bright and clear we made another short run, and when we tied up for the night we had made 100 miles against the stiff current of the old Ohio.

The next day we ran on into Louisville, experiencing some delay at the locks below that city, but arrived about 2 o'clock—a run of 60 miles. After laying in some necessary supplies we ran about four miles above the city and camped for the night.

While there we saw a sister launch on fire away out in midstream, and rushed to the rescue, but they had succeeded in extinguishing the flames before we reached them. The next day we made the Kentucky River, and camped a short distance below the first lock.

From that time on our trip was one long series of delights; making fine time, as there is very little current in that beautiful river in the summer time, stopping at night and realizing the fascinations of roaring camp fires and reveling in the grandeur of the ever increasing wildness and beauty of the scenery.

The Kentucky River is certainly the gem of the South so far as scenery is concerned. The Palisades exceed those of the Hudson in height and extent. Precipitous cliffs bound both banks of the river for nearly one hundred miles, and for long distances run straight up from the water's edge to a height varying from three to four hundred feet, so that once we had difficulty in finding a level space large enough to camp on.

A little less than 100 miles up the stream we passed under the famous high bridge, which has the distinction of being the loftiest bridge structure in the world. At Valley View we turned our bow down stream, and when we reached the Ohio, decided to go to Cincinnati, 75 miles further up.

We stopped that night on a fine gravely beach just above the mouth of the Kentucky River, but failed to put out our stern anchor. About midnight, the leviathan of the upper Ohio, the *City of Louisville*, came along, making probably 26 miles an hour, and in passing us, although she was at a distance of more than a quarter of a mile, her bow swell lifted our boat out of the water and landed us high and dry, so that we could walk around all sides of our little craft on dry land. After a few hours' hard work we were afloat again and on our way to Cincinnati, which we reached that afternoon.

On our return we made Louisville the first night, 137 miles, and Owensboro the second, the latter 160 miles from Louisville. According to the government chart we made 946 miles straight, and with some extra runs that we made swelled the total to 1,000 miles if not more. We were out just eleven days. One whole day was spent at Cincinnati, parts of days spent at Frankfort, Louisville and other points. With the time consumed in passing through eighteen locks (nine each way) three days might be deducted, leaving eight days for the running time.

The only repair necessary on the whole trip was the renewal of the dynamo brushes. I have made many similar trips without a cent spent for repairs. I think that is a good demonstration of the capabilities of a small boat properly built and equipped. My boat is 33 feet long, 6 1-2 feet wide, and affords comfortable sleeping quarters for six men. The power consists of a double cylinder "Globe" motor, the cylinders being 6-inch bore and 7-inch stroke, with clutch and reverse mechanism aft of the engine.

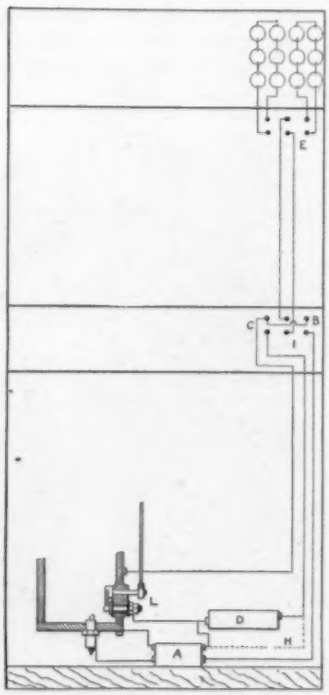
H. KIMBLEY, M.D.

Owensboro, Ky.

Electric Ignition Device.

Editor THE AUTOMOBILE:

Sir:—I enclose a sketch of the way I have my carriage wired. I have used



SKETCH OF ELECTRIC IGNITION DEVICE.

nothing but the very best triple braid rubber covered wire, keep my coils just as close to the plugs as possible, and don't have very far to carry the high tension current. I use double pole, double throw switches, *E* and *I*. By throwing switch *E* to the right I cut in one set of the batteries and by throwing it to the left I cut in the other set, so by this arrangement I can work one set awhile and then the other one, and the batteries last longer. Switch *E* is located in the dash, switch *I* being on the seat just under the flap of the cushion. By throwing this switch over to *C*, I cut in coil *D* for the touch or wipe spark, and by throwing it over to *B*, I cut out *D* and cut in *A*, which is the jump spark, leaving the points at *L* to make and break the contact, my advance being at the end of the rod next to the reduction gearing. This may seem to be very complicated for carriage wiring, but I have yet to have my first trouble with it. I can change from one spark to the other without stopping, and it comes in mighty handy when a plug goes wrong to switch over to the old back-date hammer spark to bring me in. D. W. McE.

Dallas, Tex.

[It will be understood that our correspondent uses the make and break of his wipe spark circuit to close the primary circuit of his jump spark coil.—ED.]

Compression in Explosion Motors.

Editor THE AUTOMOBILE:

Sir: Will you please answer through your valuable paper the following questions?

What the compression would be above atmosphere in a four-cycle engine 6 inch bore and 6 inch stroke, with a compression space of 40 cubic inches. Also state if you use Boyle's or Mariotte's Law in solving, and how high compression can be carried safely? C. G. H.

East Providence, R. I.

[Boyle's Law, otherwise called Mariotte's Law, is not to be used in computing the compression and expansion curves of internal combustion engines, as this law assumes the temperature of the compressed or expanding gas to remain constant. As the gas is in fact heated by compression and cooled by expansion, its pressure will rise on compression above what Boyle's Law would indicate, and decrease with corresponding rapidity on expansion. The equation used can only be solved with the aid of logarithms, but any text book on compressed air will give curves or tables which will fit the case in hand fairly well.

The piston displacement of a 6 by 6 cylinder will be about 170 cubic inches, and if we assume an initial pressure (absolute) of 13 pounds, the pressure at the end of the stroke, with a clearance space of 40 cubic inches, will be about 125 pounds absolute, or 110 pounds gauge, assuming no leakage. This pressure is altogether too high for ordinary work, and will probably cause premature ignition. A safe rule for medium and high

speed engines is to make the clearance space 1-3 of the piston displacement, which would give a compression of about 86 pounds absolute or 71 pounds gauge. For small cylinder sizes or slow speeds the clearance may be made a little larger, and when a high degree of refinement is desired it may be slightly reduced.—Ed.]

Cross Section of Tires.

Editor THE AUTOMOBILE:

Sir:—I have a theory on tires, regarding which I would like to get the expressions of other users of motor cars. I live in a town where there is many miles of asphalt paving, and now that our rainy season is on the city fathers do not seem to think they need the care they do in dry months. My car is fitted with 4-inch tires that are round. Of course, these give lots of surface that touches the ground. It seems to me that if tires were made somewhat oval, up and down, they would give a better grip on the road surface, as they would be narrow at the tread. It is my theory that tires with somewhat of an edge at the ground point would grip better and prevent the skidding which I now experience with my round tires. Can the thing be more than a theory?

JAMES VARLEY.

Standardization of Chassis and Rims.

Special Correspondence.

CLEVELAND, March 5.—A chassis frame of one piece of channel iron is a thing of the near future, if the plans of the Standard Welding Company, of this city, are carried out, as it seems now they will be. The company has been waiting to see if the manufacturers cannot decide upon some kind of a standard for the frame, and the management believes that enough has been done along this line to warrant them in arranging for the manufacture of this part. The spring mounts will be welded to the frame, also thus producing a lighter construction and at the same time a stronger one than is now in use.

This company has also prevailed upon all the tire makers under the G. & J. clincher patents to agree upon a standard so that in case the owner of a machine wishes to change the size of his tire he will not be compelled to have new rims. It will also aid those who may have trouble with tires when they happen to be in some locality where they may not be able to secure tires to fit the rims they have. With the arrangement now made and followed by most of the manufacturers a 2 1-2 and a 3-inch tire will both fit the "1A" and "2" rims, while the 3 1-2 or 4-inch tire will both fit the "4" rim, used on heavy vehicles. While this system is of great value to the users of automobiles, it is also of value to the manufacturers, as they will not be compelled to keep a large stock of various sized rims on hand, but are sure that the two sizes named will be adapted to the use of any tire.

Motor Bicycles at the Chicago Show.

The only novelties displayed in the motor bicycle line were the Mitchell 3 1-2 horse power mile-a-minute single-cylinder two-wheeler, the new Mitchell two-cycle 2 1-4 horse power bicycle, made by the Wisconsin Wheel Works, the single and combination tandem motor bicycles of the Wagner Cycle Co., of St. Paul, and the Thor motor bicycle and components of the Aurora Automatic Machinery Co., for which Brandenburg Bros. & Alliger are sales agents and made the display. None of these bicycles has been thus publicly exhibited before.

The Mitchell mile-a-minute has a specially built and trussed frame of graceful lines, with the main front tube bent sharply downward to form a seat for the motor, which stands nearly vertical just back of the front wheel. The fins of the cylinder are of copper. The muffler is in the form of a perforated straight tube 1 1-8 inches in diameter, loosely wound with fine copper wire of carefully regulated tension. This tube lies close alongside of the front frame tube ahead of the motor and points downwardly. Drive is by belt of rawhide composed of half a dozen loose strands slightly twisted and wound with a flat strip one inch wide, wound helically around the strands but very loose. There is no idler to regulate the tension, slack in the belt being taken up by unhooking the ends and giving the belt a few twists by hand. The front forks are trussed. The gasoline tank has capacity for 100 miles.

The new two-cycle machine was kept in the background at the show, as the company contemplates making some further changes in the motor, which will make this one of the cheapest motor bicycles to produce, but which will delay deliveries for at least two months. The motor runs up to 1,400 r. p. m. and develops 2 1-4 horse power. It has neither inlet or exhaust valves, simple ports on opposite sides of the cylinder at its lower end serving the purposes. The exhaust is muffled in the frame. Simplicity is the great characteristic of this machine.

The Thor motor cycle and components are notable for their excellence of material and careful workmanship, which have always been distinguishing points of Thor hubs and other productions. In this machine the motor is carried in upright position above the crank-bracket, occupying the place of the seat mast. The battery and coil are cylindrical and are carried by the main lower frame tube, while the muffler is below the crank-bracket and the gasoline tank is carried back of the rider's seat above the rear, to whose periphery the bottom of the tank is curved to conform. The motors and component parts are furnished by the Aurora Company to be assembled into these complete cycles after blue prints that accompany them.

A supplementary bottom tube, bent deeply downward between the front wheel and the crank-bracket to form a seat for the upright motor is the distinguishing characteristic of the Wagner machines, both single diamond and combination diamond and drop frame. It is designated as a diamond frame with motor loop. The lower portion of the loop is nickled instead of enameled, and conducts the exhaust gases from the motor head to a small muffler under the crank-bracket. Drive is by twisted rawhide belt. Another special feature of those machines is a double or twin fork, the outer blades of which are prolonged through a supplementary crown plate to another plate at the top of the steering head. The combination tandem has the same construction for the diamond frame front, but has a

STAND OF THE E. K. THOMAS MOTOR CO. AT THE CHICAGO SHOW.

drop frame built on behind. As the operation is wholly from the front seat, it can be ridden by one person.

In addition to the foregoing motor bicles the Thomas Motor Co. showed two of its 1903 spring-fork Auto-Bis, the Hendee Manufacturing Co. one of its Indians, with chain drive, Marsh Bros. a 3 horse power belt-driven Marsh, and the Merkel Manufacturing Co. a Merkel with motor carried on the main lower tube.

An Ingenious Motor Sleigh.

Michigan may boast of a motor sleigh, designed by Senator J. K. Flood and in which the propulsion problem has been solved in an entirely novel manner. Reasoning that a propulsion wheel would necessarily have somewhat the same effect on the motion of the vehicle as the ordinary rear driving wheels of an automobile, the Senator simply leaves the rear wheels on his automobile, reduces the inflation of the tires and jacks the rear portion of the vehicle up on a pair of runners close inside of the wheels and on a special pair of springs, in such manner that a load in the vehicle bearing down on the runner springs forces the runners to the ground on a level with the wheel tires, leaving most of the weight on the latter. The soft inflation of the tires compensates for inequalities, and it is stated that the driving effect is quite sufficient, though offhand it would seem doubtful if the arrangement would be adapted for hill climbing.

The front wheels of the automobile are, of course, replaced with runners, which are pivoted in the usual manner for steering purposes, and the gliding effect of sleigh motion is said to be obtained perfectly by this combination of wheel and runners in the rear and runners alone in front.

SENATOR J. K. FLOOD OF MICHIGAN IN HIS AUTO SLEIGH.

Automobile Show in Philadelphia.

Special Correspondence.

PHILADELPHIA, March 2.—With no blowing of horns or opening ceremonies of any kind, the Second Annual Automobile Show was launched for a seven days' stand at Horticultural Hall February 28.

The sight which met the gaze of the thousands of visitors who were on hand was an inspiring one. It must be admitted that the social feature, at this early stage of the show, seemed to be uppermost, and if in no other particular, the show may be stamped a social success. It cannot be denied that at the hour announced for the opening there was an apparent unreadiness in the various sections of the show, which marred the initial impressions of the "first nighter." This unpreparedness was mainly due to the poor facilities for getting the heavy machines from the street level up to the main exhibition floor—a second-story height. The only appliances at hand were an elevator of limited size and power. Any vehicle over 1,000 pounds in weight and ten feet in length had to be raised with block and tackle, rigged in a hurry. Some of the exhibitors, not knowing the conditions, arrived at the hall late Saturday afternoon and found from 20 to 25 vehicles lined up in the side street awaiting installation in the hall.

The hall is much too small for the purposes of an up-to-date automobile show, many large concerns being relegated to the foyer and the lower floor, where their displays are necessarily contracted on account of the limited accommodations. But there are compensations—for the visitor, if not for the exhibitor. Horticultural Hall is one of the finest in the city, its handsome stairways, marble columns and wall decorations giving the main floor an air of solidity and elegance quite in keeping with the flashing brass, copper and enamel of the expensive, "rich men's playthings." To those of the exhibitors who spent a week at New York or Chicago, the change to a handsome, well-lighted and comfortable hall is gratefully appreciated. As one of them expressed it: "This building lends itself to an exhibition of this character. It seems more like a society function than either the New York or Chicago shows. But at Chicago—br-r-r-r-r!" Quite expressive, wasn't it?

Of course, the limited size of the hall precludes any possibility of actual inside demonstration; but the majority of the exhibitors surmounted this difficulty by having one or more machines constantly on Broad Street in front of the hall, and day and night the sharp exhaust of the gasolines and the raucous bark of the automobile horns resounded above the din of street traffic in the vicinity of the hall. With a 60-foot-wide asphalted highway nearly ten miles long at hand, the facilities for actual demonstration could not be said to be lacking.

THE EXHIBITS—MAIN HALL.

The Banker Brothers had the star exhibit—not only the prettiest, but the most comprehensive, including the Autocar, Peerless, Orient, St. Louis, Waverly, Knox, Pierce, Waltham, Orient, Buckboard and Northern—16 vehicles in all, including the chassis of two—the Peerless and the Autocar. With the best location, immediately under the immense electric chandelier, their exhibit encroached on the stage and even occupied a space or two across the aisle. The vehicle which attracted the most attention in the Banker display was the 90 horse power vehicle, with which L. P. Mooers, of Cleveland, Ohio, will endeavor to secure a place as one of the contestants for the Gordon Bennett Cup.

A close second as regards comprehensiveness and beauty was the display of John Wanamaker, which included Searchmonts, Cadillacs and Studebaker electrics. Electrical decorations and signs added greatly to the effectiveness of the exhibit, and the booth was constantly surrounded by inquirers and point-seekers, who displayed a knowledge of the A B C's of automobilism which seemed to surprise even the calloused and show-hardened attendants.

The Oldsmobile and the Toledo, shown by the Quaker City Automobile Co., came in for a fair share of attention—the former especially. Lightness, inexpensiveness and ease of control seemed to appeal to a large class of visitors, and the demonstration Oldmobiles in front of the hall

were worked to the limit afternoon and evening. Franklins were also in evidence at this stand—nine machines in all, including Oldsmobiles and Toledo chassis, and the Oldsmobile coupe, in which many local disciples of Aesculapius seemed to evince much interest.

The Jones-Corbin Co.'s 700-pound replica of the big flyers came in for all kinds of favorable mention. "Isn't it cute?" ejaculated one enthusiastic maiden in the crowd of High School girls which surrounded the jaunty little machine.

W. W. Gawthorp, local agent, showed three models of the Elmore—a tonneau four-seater and two runabouts—handsome vehicles and nicely finished.

The Daimler Mfg. Co., of New York, through its local agent, J. Henry Mitchell, was badly handicapped through its inability to get its large gasoline delivery wagons up the diminutive hatchway. He tracted much attention. F. A. La Roche, of New York, general sales manager, was in charge.

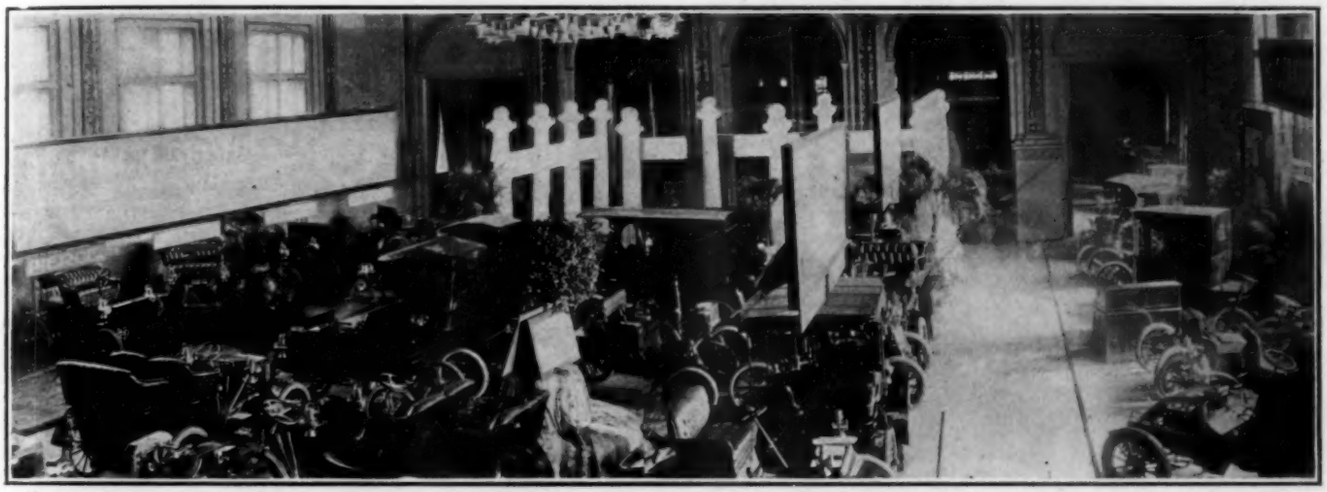
Wintons—the powerful tonneau and chassis—were installed in a corner of the foyer. As a sure representative of American speed machines in the coming international races, the Winton was constantly surrounded by a crowd of sightseers. A. E. Maltby was in charge.

The Pennsylvania Electric Vehicle Company exhibited Conrad gasoline runabouts and tonneaus in addition to its usual line of Columbia electrics. There was also here an exhibit of the Exide battery and the vehicle battery parts manufactured by the Electric Storage Battery Co., of Philadelphia.

The Wm. F. Rudolph Co., local agents, showed a handsome Packard tonneau and two long distance vehicles, runabout and tonneau. In addition the Equipment Company, of New York, through its sales agents, the Rainier Company. Two delivery wagons, a two-ton van and a huge five-ton beer truck, made up the display, which attracted much attention from the hundreds of business men who visited the show. The exhibit, fortunately, was on the ground floor; otherwise not a single vehicle could have been shown. As it was, the doors leading to the "Sundries Hall" had to be removed to admit the huge beer conveyance, which was suggestively labeled "Hell Gate Brewery."

One of the "Sundries Hall" features was the Marsh motorcycle.

The Racine Boat Manufacturing Company showed nine boats—three of them run by gasoline motors of that company's approved design. The Hart Cycle & Automobile Company, local agents, had almost its whole floor force in attendance,



Photograph by Courtesy of the "North American."

GENERAL VIEW OF THE MAIN HALL AT THE PHILADELPHIA AUTOMOBILE EXPOSITION.

compromised by putting in one of the smaller Daimlers that has been doing service around the streets of Philadelphia for many months, eking out the display with a fine set of photographs of the remainder of their product.

The Thomas "World's Record" was shown by the managers of the Philadelphia Automobile Station, who are the local selling agents. One machine was shown, a four-seated tonneau enameled in Frontenac brown—a natty vehicle and much admired.

The Sterling Automobile Co., local agents, exhibited the new Rambler and a Duryea. In a picturesque corner of the foyer were installed the Shelby and Sandusky vehicles. The booth was in charge of James C. Wormley, of New York, manager of the Eastern Department. The Shelby combination two or four passenger car came in for a great deal of favorable comment.

The Darracq exhibit was one of the last to put in an appearance. As the only strictly foreign exhibit it naturally at-

Rudolph & Summerill Tubing Co. exhibited a comprehensive display of its product.

Blaylock & Blynn showed a handsome case full of the latest spring hats, which seemed to jar on the sensibilities of many of the visitors. However, this was but a side issue to the display of fur and leather automobile garments, which made up the bulk of the exhibit.

Edward B. Ryder's exhibit of automobile caps included everything in that line affected by the up-to-date motorist.

One of the latest things on the market, the Baker Automatic Funnel, was demonstrated at one of the balcony booths by Mrs. Walker, of New York city. This handy little device absolutely prevents the introduction of dust into the gasoline or water while filling tanks and does away with the uncleanly slopping unavoidable while using the ordinary funnel.

The Sundries Hall.

The most comprehensive exhibit of business vehicles was that of the Vehicle

and with the show but one day old a number of sales were reported.

Another feature which caught the eye of the visitor as he entered "Sundries Hall" was the fireproof and weatherproof automobile house exhibited by the Keasby & Mattison Company. It was erected in two hours on Saturday afternoon by a force of two men!

Indian motor cycles and Splitdorf coils had a combination booth, in charge of Charles Krause, local agent, which seemed to attract a host of inquirers as to the merits of motor bicycles.

The Rose Mfg. Co.'s Neverout Lamp display came direct from the large shows, and with the aid of the electric current added not a little to the excellent lighting facilities of the hall.

The same may be said of the display of the Twentieth Century Mfg. Co., whose exhibit was also brought intact from the large shows.

Gibney Brothers, local agents for Fisk and Firestone tires, displayed, in addition a handy tire vulcanizer.

CARNIVAL FEATURES AT THE BOSTON AUTO SHOW.

STUNTS BY EXPERT OPERATORS.

Amateur Managers Successfully Plan and Carry Out a Varied Programme of Entertainment for Show Visitors—Grade Climbing and Teeter Board Balancing Interspersed with Obstacle Races—Car is Sent Around Track Without Driver.

Special Correspondence.

BOSTON, March 9.—Probably twelve or fifteen thousand people visited the Boston automobile show Feb. 24 to 28, inclusive, and in many respects this carnival of the New England Automobile Association was one of the most remarkable shows of the kind ever given in this country. Starting with practically no advance advertising, and with hardly a feature on the program, the amateur managers turned themselves to planning and prospecting so energetically that by the time the end of the show week approached each afternoon and evening was filled with stunts and tricks for autos, and varied with acrobatic feats, bicycle riding and trained dogs, in such a manner that there was absolutely not a dull moment. The show was really an exhibition of expert operation of motor carriages, and as such it has had no equal, perhaps, in any indoor affairs of this sort since autos came into popularity. The cars on exhibition were stalled under the galleries at the sides of the hall, and took up only a moderate space; but the whole of the great floor was given over to the uses of an arena, in which there was room enough to show what autos can do and to give some very pretty and difficult demonstrations.

The ordinary running of a carriage on the floor included, of course, circling the hall again and again; but runways were constructed at each end of the stage, so that the business of circling the hall could be varied by running up a 26 per cent. grade to the stage (a five foot rise), running across to the other side and then down another runway to the floor again. This made a great hit with the novices who had the chance to take a ride—and there were hundreds of them.

TEETER BOARD TEST.

For the experts alone, a teeter board at the stage end of the hall afforded endless interest in rivalry as to who should secure the most perfect balance with variuos types of automobiles. This kept up the interest of the experts themselves and was a constant amusement to the crowds. Late in the week, through the agency of H. B. Shattuck and the Olds people, the show managers built a flight of stairs and decline from their top, at the lower end of the hall, and all the lighter grades of cars were pitted against one another in essaying a climb over this construction. As luck would have it, the Olds operator was not the first to achieve it, but all the lighter cars did it in time. A Knox made a quick record on climbing it, and a Winton, so wide in the tread as to hardly fit the stairs, was driven up without mishap, although contrary to the advice of some of the experts themselves. One stunt which proved a marvel to the crowd was the running of one or two of the large touring cars around the hall without operator or passengers. This was done first by Mr. Dole with a Robinson. He ran it into the floor, started it in a circle at slow speed, then locked the steering wheel and alighted. The big car continued as docile as could be wished, making the turns like clock-work and giving a great idea of the certainty of control of the machines to novices who chanced to be present. It was found that in this trick the car edged toward one corner of the hall at the rate of about one-eighth of an inch for each circle, but this was attributed to a slight dip to the flooring occasioned by relaying a half section a few years ago.

THE DAILY PROGRAM.

As a rule the program for each afternoon consisted of a parade, a half hour of promiscuous running, a coat and vest race, a pin race, a slow race, an obstacle race, a performance by E. Doane on a tightrope stretched on an Olds moving slowly around the hall, and the various stunts outlined above. An orchestra gave concerts also.

Of the races mentioned the coat and vest race made the greatest hit. It was tried first with single operators. Each carriage made a circle of the hall, stopped at a post, where the operator alighted and took off cap, coat and vest on successive trips around, then reversed the operation, stopping each time to fasten every button on each garment before entering the auto again. Later the race was tried with touring cars containing four persons each, and the scramble occasioned when each party tumbled out and gave its exhibition of rapid changing of raiment was something which did not fail to win signs of hearty enjoyment from the spectators. The pin race required rival automobile crews to carry nine-pins one by one from positions in line at one end of the hall to similar positions at the other end, the time being taken to determine the winner. The obstacle race was the ordinary test of threading a way through pins set up so that a carriage could move among them only with extreme difficulty, a falling pin being counted as a demerit. One other attraction was a quadrille with light autos, performed while the floor was otherwise clear.

The show committee consisted of Col. Elliott C. Lee, of Brookline; Frederick Tudor, of Boston, and Dr. W. A. Rolfe, of Boston, acting with Col. James T. Soutter, president of the New England Automobile Association and the Massachusetts Automobile Club, and Dr. F. L. D Rust, the club secretary.

VEHICLES ON EXHIBITION.

Vehicles actually exhibiting in this show were: Two Buffums, loaned by Dr. W. S. Shrigley and Dr. W. A. Rolfe, of the Massachusetts Automobile Club; a Renault, loaned by H. D. Corey; a Georges-Richard, loaned by Royal R. Sheldon; two Wintons; a canopy-top Robinson touring car; a Robinson, without top; one American, three Packards, six Oldsmobiles, including an opera phaeton; one Fournier-Searchmont, two Autocars, three Knox-mobiles, one Duryea, one Stevens-Duryea, one Pierce motorette, one Country Club car, one Crestmobile, one Elmore, one United States Long Distance, one Automotor, two Decauvilles, two Clement cars, with a Clement chassis and a four-cylinder Clement motorcycle; a Waverly electric, a Columbia surrey electric, two Mobiles, two Stanley steamers, a White runabout and a While delivery wagon, three Marsh motorcycles.

None of the steam carriages were operated on the floor on account of the restrictions of the Fire Underwriters. But the total number of cars in the show was about fifty.

EXPERT OPERATORS PRESENT.

The list of expert operators actually seen on the floor was the best ever congregated east of New York, if not in the whole eastern section of the country, so far as indoor exhibitions are concerned. It included Harry Fosdick, with a Winton; George G. Reed, with a Knox; Ralph Lewis, with a Pierce; J. R. Chisholm, with a Decauville; Messrs. Dole and Coleman, with Robinsons; James Calnan, R. R. Ross, Fred Graves and E. Doane, with Oldsmobiles, Packards and Autocars; F. H. Townsend, with the Renault; E. W. Fellows, with a Clement; Mr. Altham, inventer of the Country Club car, with his machine; E. H. Frederick, with a Decauville; A. J. Coburn, with an Elmore; R. F. Coburn, with a Crestmobile; C. H. Wilson, with a Rambler; Harry Parks and Frank Johnson, with Marsh motorcycles; Jimmy Baker, with an American, not to mention several others who took cars about the hall at times of general parade, in the opening hour each day and evening.

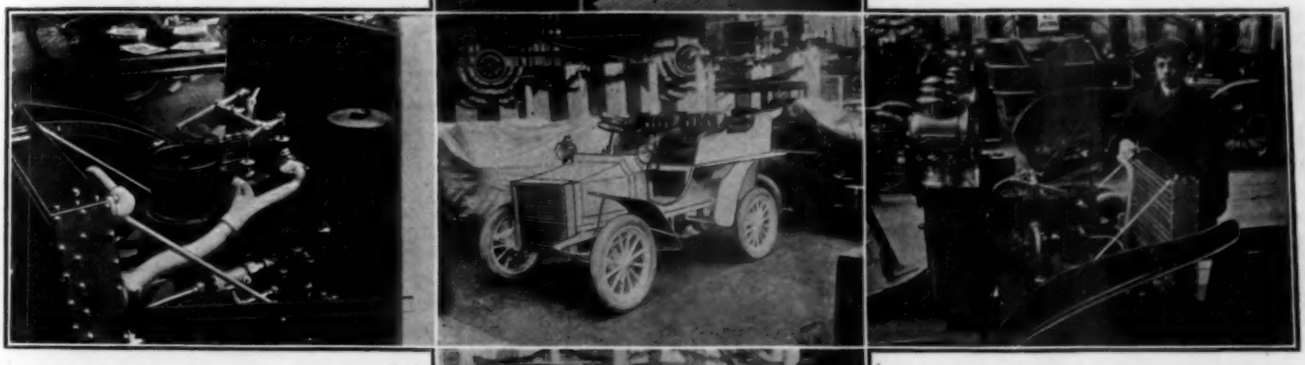
A club run to Washington, D. C., and return, spending two days in the Capital, is planned for the Easter holidays by the Cutler Automobile Club, of New York city. Three days will be spent on the road each way, night stops being made at Philadelphia and Wilmington. It is expected that many motor enthusiasts will participate, as outsiders will be allowed to enter if introduced by a club member. Arrangements with hotels in the stopping places and in Washington will be made to prevent any delays. Particulars may be obtained by addressing the president of the club, Arthur H. Osborne, at 70 East Fifty-sixth Street, New York city.

NEW VEHICLES

White Tonneau Type Car.

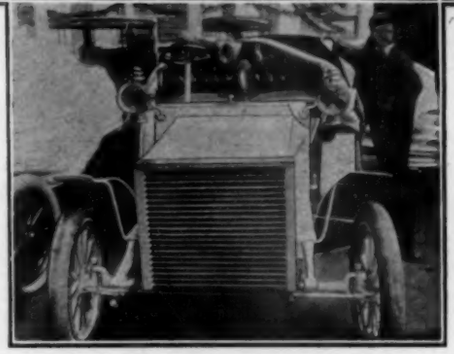
At the White Stand in the Garden Show there was exhibited a steam driven tonneau-body vehicle which was really a competitor for first class patronage, as it was fine in finish, noble in outline, more perfectly powered and driven, perhaps, than any other carriage at the exhibition.

It was not handicapped, either, with that vulgar thirst for water which is a characteristic of most steam wagons, because the machine exhibited had been fitted with a condenser, for which high efficiency is claimed. As between 15 gallons of water and 40 gallons carried on a wagon, there is a difference of, say, 250 pounds weight, which is not so very important, perhaps, when considered merely as non-paying load, but the condenser type has the additional and great advantage of not only saving a considerable weight, but relieving the driver from all anxiety as to feed water replenishment.



Front with hood removed showing compound engine, low pressure cylinder in front, exhaust pipes to condenser.

Hood removed showing engine and condenser from right side.



Rear of dash board, showing gauge and foot treadles.
White Steam Car, tonneau body 1903 model, with condenser.
Front view showing condenser and front axle steering construction.

The idea of applying the condenser to road wagons is a very old one, but until recently it has not been made a practical commercial success. It is specially adapted for use with the flash type of boiler such as is used in the White machine, as in this type of boiler there is a force circulation and priming does not effect its action, so that one of the difficulties caused by the presence of any oil from the condensed steam in the boiler is eliminated in this form of steam generator. The White shows a compound engine this year in place of the two-cylinder simple engine previously used. The compound engine has been tried at various times in the steam road wagon. It has the advantage of using little weight of steam because of the high range of expansion and also of greatly increasing the short time effort by the possibility of feeding both cylinders with steam at full boiler pressure. This is effected in the White by depressing a foot lever. The duration of time in which the engine may be run is, of course, only limited by the boiler capacity, which under these conditions has to supply live steam to both the large and the small cylinders at the same time.

The engine is placed with the low pressure cylinder in front. The crank shaft runs horizontally lengthwise of the wagon, with the customary universally jointed propeller shaft extension, which carries a bevel pinion engaging the balance drum bevel gear; the propeller shaft carries a brake drum, the band of which is actuated by a pedal. In addition, there is an internal brake drum fitted with an expanding internal shoe, on each rear wheel hub, these two hub brakes being worked by a lever at the right of the operator, just outside of the reversing lever.

The circulation of the feed is secured by a positively driven force pump with suction connected with the condenser and which discharges into the water tank, the feed passing through an oil separator on the way. The boiler feed pump continues the cycle of operations by feeding the boiler from the tank. A tilting air pump which can be brought into position by a pedal so as to effect an engagement between its plumger and a pin or stud on one of the engine cross heads, is used to maintain the fuel tank pressure.

A ventilating tube is enclosed by the fenders on each side of the wagon body, to carry away the air heated by the boiler in the boiler compartment of the wagon body. The water tank is of only 10 gallons capacity and is in front, conforming to the dash outline.

The weight of the wagon is 1,600 pounds, and it is carried on 30-inch artillery wheels, shod with 4-inch clinched tires.

Wheel steering, with tangent screw and woven gear segment, is used. The throttle-controlling rod is carried through the steering shaft, and is operated by a small handwheel above, and concentric with, the steering wheel.

Two hand-operated pumps are provided, one for water and one for air, for use when the motor is not available.

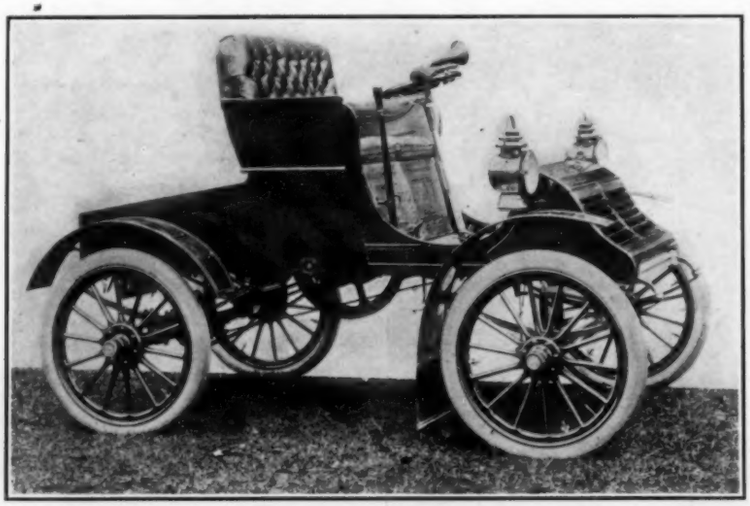
The details of construction are as follows: Seating capacity, 4; rated horse power, 10; engine, compound; wheel-base, 6 feet 8 inches; tread, 4 feet 8 inches; wheels, 30 inches diameter; tires (clincher), 4 inches; weight (tanks filled), 1,650 pounds; extreme length, 10 feet; extreme width, 5 feet; extreme height, 5 feet 2 inches; capacity of gasoline tank, 10 gallons; capacity of water tank, 15 gallons; aluminum body and guards.

The adoption of the tonneau type of body is in line with the productions of the leading European steam vehicle builder, M. Serpollet, whose most recent vehicles are hardly distinguishable at first glance from the conventional type of gasoline tonneau cars.

American Motor Carriage Co.'s Car.

An automobile of very graceful and attractive appearance is the Model "A," made by the American Motor Carriage Co., of Cleveland, O., and shown in the accompanying illustration. This vehicle

is the result of a year and a half of experimenting, culminating early in 1902 in the leasing of property at 514 East Prospect street, in Cleveland, and the beginning of the manufacture of gasoline automobiles. Since then the plant has been overhauled and additional machinery installed so that the daily output is now five complete machines.



AMERICAN MOTOR CARRIAGE CO.'S 7-H.P. GASOLINE CAR.

Model "A" is a single seat vehicle with a long wheel base. An angle iron frame is used and it carries the entire mechanism. The motor, which is hung centrally, is of the water-cooled type, and of 7 horse power. The transmission gear, an adaptation of the planetary system, gives two forward speeds and one reverse, the drive being direct on the high speed. All bearings are bushed with phosphor bronze and are lubricated by gravity feed from a copper tank through a system of sight feed oil valves. The transmission and crank-pin are lubricated through the center of the crank-shaft. The same lever which operates the electric switch also starts and stops the flow of oil.

The contact is of original design, operating with a plunger in an air-tight case, and is so controlled by a governor that the spark is advanced and retarded automatically. Eight cells of batteries are provided, four being held in reserve.

The Longuemare carbureter is used, and the copper gasoline tank is located near it, obviating the necessity of a long connecting tube. The water tank and radiating coils are located in the front hood, the water being circulated by a positive gear pump, keyed direct to a stud in the end of the crank-shaft.

The car is controlled by a hand lever giving the two forward speeds, while a foot lever operates the reverse, and may be used also as an emergency brake. Powerful expanding brakes are located on each rear wheel. The steering gear is equipped with a large wood-rimmed hand wheel.

Accessibility of all the parts, extreme simplicity of construction and care in points of detail are the chief aims of the designer of this car.

Buffalo Golf Brake.

Since the Buffalo Electric Carriage Company entered the automobile manufacturing industry, about five years ago, it has given the carriage body full attention, both in regard to style and workmanship, as might be expected of a concern whose president and manager had been one of the largest carriage builders in the United States before automobilism existed. The result has been a number of vehicles recognized as correct and "smart" and found always to be substantially built. One of the most admired of these is the "Golf Brake" shown herewith, which certainly is built on striking and yet pleasing lines. It is capable of about 17 miles per hour and has six forward and four backward speeds operated by the controller, and the battery with proper handling is good for fifty miles of travel on fair roads. Unlike this company's well known Stanhope, which is a lighter vehicle operated with one electric motor, the "brake" or park trap has two motors, one for each rear wheel, thus dispensing with the differential gear. The upholstering is usually in Bedford cord.

BUFFALO ELECTRIC CARRIAGE CO.'S GOLF BRAKE.

Stability of Three Wheelers.

A. E. Osborn, patentee of the three-wheeled vehicle described in our patent department in the issue of January 24, writes in answer to the last remark of that review, that "it is not obvious how, in such a machine as this [with the front wheel driving] sufficient weight can be put on the front wheel for traction without impairing the stability." He explains that the vehicle is only intended for runabout uses and low speed, and points out further that less driving force is really needed than in the case of four-wheelers, and that, if the driving wheel should slip, it would not result in skidding. Again, the location of the motor just back of the front wheel permits it to be hung very low, which of course favors the stability.

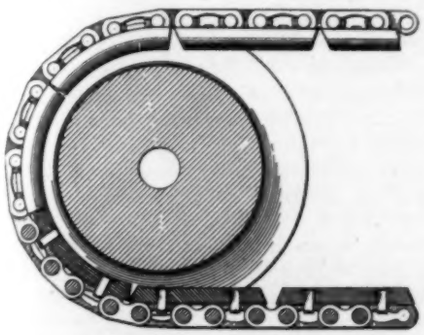
New models of almost every American motor vehicle will be displayed at the automobile show of the Boston Automobile Dealers' Association, which opens in Symphony Hall, in that city, March 16. The indications are that this will be the most complete and up-to-date display of automobiles ever given in New England. It will be in every respect a dealers' show and there will be about 50 exhibitors, with more than 300 vehicles displayed. This will be the first automobile show in Boston under the auspices of the local trade.

Patents

Motor Cycle Drive Belt.

No. 721,643.—I. M. Willie, of Freeport, Ill.

A belt for motorcycles, consisting of a suitably formed chain to which short



WILLIE COMBINATION CHAIN BELT.

strips of leather are riveted, the rivets being preferably so attached to the chain as to permit slight endwise motion of the leather strips when bent. If a sprocket chain is used, with the rivet heads properly concealed in it, a sprocket idler may be used to maintain tension. Either a grooved or a flat pulley may be employed, the former being indicated in the drawing.

Non-Slipping Tire Shoe.

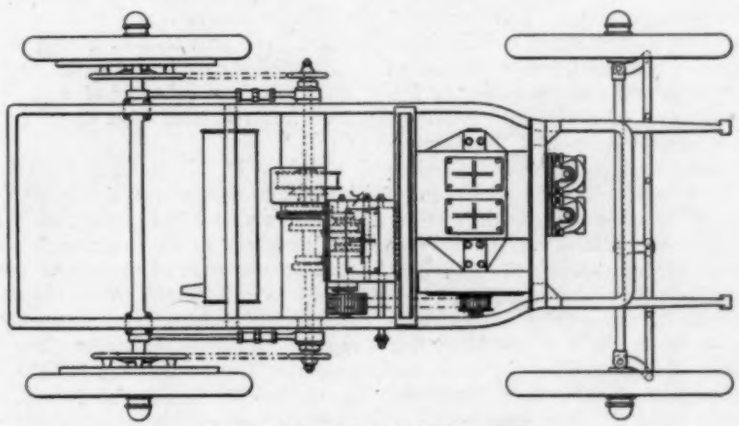
No. 710,562.—P. De Caters, of Berchem, near Antwerp, Belgium.

A non-slipping armored tire shoe with metal rivets on the tread, secured to the tire by hooks engaging a wire ring at the side of the arm, which ring is cut at one point and has a turnbuckle to tighten it.

Transmission System.

No. 721,413. H. Austin, of Erdington, England.

The transmission system of the Wolseley gasoline car is the subject of this patent. The Wolseley car has the two-chain drive, but substitutes transverse shafts and a Renold chain for the common longitudinal shafts and bevel gears. The claim covers this construction, with the use of the second gear shaft as the sprocket-carrying shaft, with the differential gear carried thereon.



WOLSELEY TRANSMISSION SYSTEM.

Wheel Shoes.

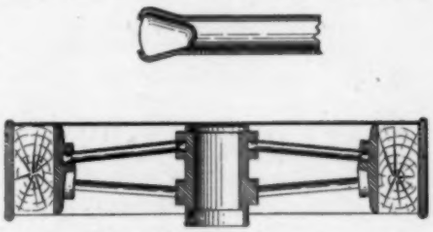
No. 715,094.—C. S. Langton, Parkersburg, Ill.

A pair of spoon-shaped shoes, pivoted to the wheel rim and acting as levers, being spread slightly outward by the flattening of the tire under load. Suitable connection from these works a piston in a small pump attached to the rim.

Vehicle Wheel.

No. 721,380.—R. L. Morgan, of Worcester, Mass.

The purpose of this invention is to provide means for using a cast iron or steel hub and rim without setting up shrinkage strains and without unduly increasing the weight of the wheel. To this end the spokes are made of tubing, with their ends closed over conical cast iron plugs to keep out the molten metal. The rim is



MORGAN VEHICLE WHEEL.

cast with the outer ends of the spokes in position, and when it is cold the hub is cast similarly. In the preferred construction, a cushion of wood segments is interposed between the cast iron rim and an outer tire of steel, shrunk in place. This helps to deaden noise and protect the wheel and machinery.

Front Drive Steering Gear.

No. 714,878.—J. F. Duryea, Springfield, Mass.

A steering mechanism for vehicles where the front wheels are both drivers and steerers. The front axle has a fifth wheel and steering is accomplished by a worm and large worm wheel on the fifth wheel.

Punture-proof Tire Covering.

No. 721,146.—J. Butler, of Altrincham, Eng.

A tire covering containing imbedded leather strips, made short and laid end to end with ends cut angularly and overlapping, and preferably (except for racing tires) an outer tread of rubber.

Puncture Healing Compound.

No. 715,784.—L. C. Grant, of Cleveland, O., and Nelson B. Chester, of Caldwell, N. J.

This invention is described as follows in the specifications:

Said invention consists of an admixture, by weight, of the following ingredients: Granulated cork, two ounces; ground asbestos, nine ounces; ground mica, four ounces, and powdered borax, one ounce. The asbestos is ground approximately to the fineness of screen mesh No. 100 and the mica to the fineness of screen mesh No. 60. Slight variations in these proportions do not affect the principle of the invention. By careful experiment these degrees of fineness have been found to produce the best results. When ground coarser than indicated above difficulty has been experienced in pumping the mixture through the valve-tube. When ground finer the flakes have a tendency to ooze out through the tire in all but the smallest punctures. We have obviated this by the addition of asbestos, which being of a fibrous nature, when forced into the

BUTLER TIRE COVER.

puncture forms a sort of rope, which is held firmly by the elastic walls of the rubber tire. The greater the pressure the more firm and rigid is the hold of the rubber upon the asbestos, so that no amount of pressure or rough handling can dislodge it. The mica fills a secondary place, working its way into the interstices and smaller crevices.

In a speed trial in a muddy country road outside Rockford, Ill., one of the Cotta four-wheel drive automobiles which are now manufactured by Charles Cotta in that city is reported to have covered half a mile in 45 seconds, Monday, February 23. Later it climbed a steep hill at the rate of 15 miles an hour. President M. J. Budlong, of the National Association of Automobile Manufacturers, witnessed the test.

THE AUTOMOBILE

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SATURDAY, MARCH 14, 1903.

A MODERN SPARK COIL.

The article on "Constructing a Jump Spark Coil," on another page of this issue, was prepared to meet the requests of a number of our readers for a practical spark coil design. Its author is a well-known electrical engineer, whose name will be familiar to many of our readers from his contributions on electric and steam vehicle subjects two years ago.

Although intended primarily for those who wish to build their own apparatus, the design which it presents will command the attention of the manufacturers of this class of apparatus as well as the amateur. Although it seems to be and is of unusually substantial construction, this fault, if it be a fault, is decidedly on the right side from the point of view of battery consumption, as such a coil will give an ample spark with no more than two or three cells of ordinary dry battery. It therefore economizes in battery space what it sacrifices in bulk.

The point most worthy of attention, however, is the disposition of the wire of the secondary coil. In the older spark coils, of which there are still too many in use, this wire was distributed evenly from end to end of the primary coil. The result of this was that, as the moment of most rapid decrease in the lines of force around the coil is different at the ends from what it is in the middle, the current induced at the ends is not quite in step with that induced in the middle, and the two do not co-operate. This difficulty may be avoided by concentrating the wire either at the ends or in the middle, so that the "field" is nearly uniform for all parts of the coil. The former plan is that adopted by some successful coil makers, but the latter is equally effective.

Again, the insulation of the secondary is attended to with unusual care, the coil being completely and thickly surrounded by a homogeneous insulation of wax or oil. The hard rubber on which it is wound has practically a mechanical function only, and is, like all hard rubber spools with a joint in them, not worth considering as an insulation against a high tension current. If the wax should ever puncture, owing to an excessive current being used, it may be healed by warming the coil till the wax is melted, and then cooling.

Another very excellent feature, found sometimes in large coils but not often in small ones, is that the primary coil, with the core, condenser and condenser box attached, may be removed bodily, by warming the coil till the wax is melted, without disturbing the secondary in any way. The value of this will be appreciated by any one who has had occasion to repair the ordinary spark coil.

The coil as shown is equipped with a magnetic vibrator, which our readers will understand is not to be used with high speed motors. Although designed to be as rapid as possible, it would be too sluggish for speed above 1,000 R. P. M. of the motor, and a single make and break by snap cam must be substituted.

As will readily be seen, the construction of the coil is such that any number of coils required may be put side by side in an elongated box for multi-cylinder engines.

PRINCIPLE OF AUXILIARY SPARK GAP.

When an induction coil is operated, it provides at its secondary terminals not a continuous potential, but a series of potential impulses, corresponding in frequency with that of the vibrator. As the potentials usually employed in gasoline engine work are from twenty thousand to thirty thousand volts, and the energy available in the secondary circuit is at the very most 10 watts, it is easy to see that the current flowing through the secondary spark is microscopic. Assuming a secondary potential of 20,000 volts and an available energy of 10 watts, it is evident that the maximum current that can be drawn without beginning to detract from the secondary voltage is .0005 ampere. Any attempt to draw more current than this amount inevitably causes the available volts at which the current is delivered to become less; and so even the slightest leakages cause the coil to behave like a small overloaded dynamo. As the practical men have it, it will "lay down," and the voltage available at the terminals will be too small for jump spark purposes. Thus it is that the sooty plug can create such havoc with the jump spark apparatus by partially short-circuiting its terminals. If, however, another spark gap is placed in series with the secondary circuit of the induction coil and this spark gap be outside of the engine in a position where it is perfectly possible to keep it clean, the coil can rise to its full potential at each impulse unimpeded by any leak, and will presently have available at its terminals a relatively larger quantity of electricity at pressure sufficient to break down both spark gaps; and it will then jump both, preferring the spark gap in the engine to the sooty plug deposit on account of the difference in time constant of the two circuits, as this is a law of suddenly applied high tension electrical impulses.

The principle may be prettily demonstrated by experiment in the following way: The spark gap is constructed on a piece of glass by placing tin foil strips in proper relation to form discharge points. If the glass be dampened at the discharge gap, the spark will lose its disruptive character and leak across, probably showing a fine brush discharge. If, however, the strips of tin foil be cut, thereby interposing an additional spark gap, the original spark will once more occur. This will take place whether the apparatus is excited from an induction coil or a static machine, but it can even be performed by an ordinary electrophorus.

IMITATION VS. INVENTION.

French, English and American automobile designers have been influenced by the construction of the Mercedes car, worked out at Cannstatt, Germany. The latter in turn has in several of its latest mechanical features followed somewhat after the "motobloc" car, designed in Bordeaux, France, by Schaudel, a French gunmaker of Swiss descent, and with a German name. The first leaders among American automobiles were designed at Peoria, Ill., and at Kokomo, Ind., and some of their best features have now been copied in Paris.

Is there in this series of facts a strong indication that where the fashion movement in automobile construction is strongest, progress in construction is weakest, and that the great metropoles of the world would do well to look to the provinces for inspiration? Also, the Germans work mostly under French patents. The French copy the German Daimler and the Americans. Americans copy the French, and the English copy everywhere. Is this a reassertion of the justice of the prophet's plaint about honors being hard to earn at home and that familiarity breeds contempt?

Expiration of Brush Patent for Storage Batteries, and its Probable Effect on the Auto Industry.

For over a year the business of electric vehicle manufacture has been influenced by the knowledge that the Brush patents on electric storage batteries would expire by the seventeen-year limitation, in March, 1903. It has been understood that many vehicle makers would hold back their production until they could fit it with batteries containing all the improvements accumulated during a number of years without paying tribute to the Philadelphia Storage Battery Company, which so far has controlled the situation through its ownership of the Brush master patent on pasted plates, issued March 3, 1886, after being kept pending five years in the Patent Office by interference suits from Faure, of France, who used pasted plates as early as 1880, and possibly before Brush, of Cleveland.

Until five years ago other Brush patents covered the subject of separators also, but since then only the one blanket patent has been in force which prevents all but those licensed by the monopoly holders from making battery plates in which the active material is applied by mechanical means, as a paste or in any other form, the claim reading "Any mechanically applied material, either active or to become active."

TAX ON BATTERY CONSTRUCTORS.

All improvements in grids to hold the applied substance or in the nature of the material itself or in the liquid carrying the action, were held down to comparative insignificance through the ability of the Philadelphia company to impose such a tax on the general principle of construction that competitors would be unable to derive a profit from their own individual, and also patented, improvements, so long as these were not beyond all question far in the lead of anything that the Storage Battery Company could produce. And the latter controlled as good talent as money could buy to keep it in the van. The only opportunity for independent battery makers lay in the natural desire of the controlling company to maintain high prices, and this was not of special advantage to the public.

EFFORTS OF INDEPENDENT MAKERS.

One after the other of the independent makers who tried to circumvent the monopoly were forced either to pay royalty and raise their prices or to take refuge with the Planté method of construction, by which plates are made of homogeneous spongy, oxidized material throughout, in itself containing the principal of action. It became common practice to use Planté positive plates and pasted negative plates, so as to economize on the royalty for the latter, and it was even believed until lately that a battery so constituted would outlast one composed of pasted plates only. But with the improvement in separators (to prevent the pasted material from falling off and short-circuiting the cell), the batteries with all plates pasted have been proved superior in durability as well as in efficiency, and it is now predicted by those best able to judge that manufacturers who have used Planté plates will take occasion from the expiration of the Brush patents to abandon them, and that the pasted plates will be universally adopted.

It is also expected by many that the improvements which it heretofore was found impossible to squeeze in under the market price, and which therefore lay dormant, will now be generally introduced, and that nevertheless a reduction in the price of these improved batteries will be realized, as compared with such leading batteries as the Exide, made by the Philadelphia company. But it seems clear that this organization still has it in its power, by reason of its commercial efficiency, to regulate the introduction of improvements, if it so chooses, by reducing prices or offering other equivalent inducements to its customers, establishing conditions with which others may find it difficult to compete if they shall also assume the added cost of new forms of manufacture.

BATTERY SITUATION IN GERMANY.

The situation in Germany throws some light on what the public may expect here and hardly bears out much reason for expecting rapid changes in either price or quality, and certainly not in both. In August, 1900, the German makers of storage batteries attempted to form a trust (*Kartell* in German) for the regulation of prices and quality, and the attempt came to commercial grief mainly through the fact that a number of the manufacturers who entered the trust worked on antiquated systems which so affected the profits of the combination, that outsiders who had refused to join were able to break the schedule prices, especially after the price of lead had come down in sympathy with silver. The showing made in the movement was principally this: That the economical production of efficient and durable batteries depended more upon the technical perfection of the methods of production than upon any other one factor. A period of sharp practice between manufacturers followed the failure of the trust, and though Germany reached a very high development of storage batteries through the bitterness of the competition, it was represented by only a few manufacturers, while the market was flooded with articles not worth even the reduced price at which they were sold. During the past year six battery makers of high reputation and several others of lesser note succumbed to these conditions, and now the prices are again rising, while the superiority of the best German batteries over those made in the United States is not so pronounced as to make it appear very probable that a similar period of cut-throat competition in this country would result in epoch-making improvements. As for the Edison iron-nickel battery, which technically may be considered as belonging to the pasted variety included under the Brush patent claim, it has been rumored that it would be thrown on the market in quantity now that the field is free, but the rumor takes no account of the fact that the Jungner iron-nickel battery, whose inventor contests the Edison patent claims, has never given the expected results in practice that would entitle it to special consideration, and that the whole question of the electromotive value of the iron-nickel cell under ordinary working conditions has not yet been decided in its favor, while experts as a rule deny its superiority and incline to the opinion that Mr. Edison has unconsciously exaggerated its commercial importance.

A CHANCE FOR DEVELOPMENT.

At one point in the automobile development the new situation in the battery field in the United States may, it is believed, lead to greater activity, and this in connection with the gasoline motor vehicle with auxiliary storage battery and electric transmission of power. So long as this form of construction was under the thumb of battery patent owners, the inducements for experimenting were perhaps weaker than required for rapid progress. With the possibility opened for reducing the cost of production and with more chances for obtaining batteries of light weight and specially adapted for being charged and discharged under the particularly trying conditions contemplated in this connection, some results from work in this line should be forthcoming in a year or two.

H. S. Harkness, the automobile enthusiast, left New York, March 5, for a flying trip to the Pacific coast to see his family, who are spending the winter at Pasadena, Cal., before his departure for Europe for the Paris-Madrid and international cup races. He will return to New York about March 18 to superintend the final assembling of his racing machines.

Automobiles will have a place at the Rheims exhibition, which opens in Rheims, France, May 15. Applications for information should be directed to the "Administration de l'Exposition," at Rheims.

Three Matheson racing cars, made at Grand Rapids, Mich., were the only American automobiles entered in the Paris-Madrid race in time to draw lots for the start.

REPORT ON WORK ACCOMPLISHED BY MANUFACTURERS' ASSOCIATION.

Members of the National Association of Automobile Manufacturers have received the president's annual report, from which it appears that the association expects to receive about $15,000 as its share of the profits from the New York and the Chicago automobile shows this year. Last year it received $4,347.26 net from the Chicago show, this being one-half the profits realized, and this year it shared also in those of the New York show, getting 30 per cent., while the Automobile Club of America also received 30 per cent. and the Madison Square Garden Company 40 per cent. after paying all running expenses. At the end of the present year the association expects to refund to manufacturers who exhibited at these shows a portion of their expenses, but until then it intends to hold the revenue from the shows to defray the association expenses and protect the interests of its members, whose number has increased from 87 on December 31, 1901, to 129 at the end of 1902.

The object of the organization is to protect its members against unnecessary expense, and some of the best work done for this purpose has consisted in the standardization of parts. Single tube tire lugs and rims were first attacked and an agreement with single tube tire makers was effected, whereby uniformity in this detail was accomplished. Similar arrangements are under way with regard to Clincher rims, solid tire rims and lamp brackets. After dwelling upon the work done to prevent adverse legislation and in regard to freight and insurance rates, foreign trade, good roads and statistics on results from trade journal advertising, the report states:

"The secretary of the association has been gathering information for the last few months with the idea of putting before the members a plan for a directory of storage, repair, charging and supply stations throughout the United States, the information to be supplied by the members and their agents. A committee of the association is now working on a method of giving to employees of manufacturers a certificate of competency when they leave that employ, the object being to state on the certificate that the individual named has been employed by the company for —— days, months or years, and that he is competent to operate and repair machines of its manufacture. This certificate would be forwarded to the secretary and the seal of the association put on it and would expire at the end of a year. Of course, there are further details in regard to this matter, but something will eventually be worked out which, I think, will be of value to manufacturers, dealers and the purchasers of automobiles."

In conclusion the retiring president, S. T. Davis, Jr., hands the association over to his successor, M. J. Budlong, in the following words:

"The association is now large and in a healthy, strong condition, its membership having increased more than 50 per cent. during the past year. I think it possible for it to be of most valuable assistance and service to its members and believe it is growing in strength and usefulness constantly.

"I want to express my appreciation to our secretary, Mr. Unwin, for his efforts and the work he has done in the past year."

Organization of Auto Drivers.

An organization of chauffeurs, mechanics, batterymen and garage workmen in general is now being agitated among the employees of the automobile stations and repair shops in the automobile district of New York city. Although the formation of such a body has been talked of for some time among the workmen, the matter did not take definite shape until Tuesday evening, March 3, when a meeting of about seventy-five employees was held in the Central Automobile Station, at 1684 Broadway, near Fifty-third Street. Plans for organization were talked over, a temporary board of officers was chosen and it was decided to hold another meeting within a week to effect a permanent organization.

Although the proposed organization has been described in the daily press as a "chauffeurs' union" it is very doubtful if it will be a labor union, as labor union principles are understood. Affiliation with any of the local or national labor organizations, which is usually the first step for the embryo labor union, has not been sought and it is much more likely that the new organization will be of the nature of a mutual benefit association, paying sick and death benefits, such as already exists among the employees of the New York Transportation Co., which operates an automobile cab service.

It is hard to see, under the peculiar conditions of the garage employees, how they could hope to secure the usual objects of the labor union, the establishment of a regulated schedule of wages and hours. The hours of work for most of the chauffeurs now vary greatly. One day a driver may have but two hours work and the next he may be out all day and all night with a machine. At present the wages of a competent chauffeur average about $100 per month, although in some stations it falls below this, and some foremen and particularly skilled workmen are paid much more. The wages paid the employees of the New York Transportation Co. are much less, the drivers being paid as low as $1.50 per day.

According to the manager of one of the largest garages in New York city the automobile owners and proprietors of garages do not want to see a labor union organized among their workmen and most of them do not see how one could be effectively maintained, but none of them object to a mutual benefit organization.

EXHIBITION IN BERLIN OPENED WITH ROYAL POMP.

Cablegrams announce the opening of the national German automobile show in Berlin last Saturday with imposing festivities, in which participated the Kaiser, his brother, Prince Henry, Prince Friederich Leopold of Austria, and all the noble dignitaries of the German Automobile Union, which consists of the German and the Austrian automobile clubs. About 300 automobiles, all of German make, had been collected in Berlin for the occasion from the major cities of the empire, and were formed into a street parade with flower decorations, at which royalty and army officers also assisted. The show was opened by General Becker, of the Automobile Club, who introduced Prince Henry, and the speech of this genial representative of the dynasty, put the imprimatur of imperial approval on the efforts of the German automobile industry as here for the first time shown in worthy style. The presence of a large exhibit of automobiles used in the army lent further prestige of official sanction.

The most noted stand was that of the Cannstatt-Daimler firm, where the 60 horse power Mercedes car of 1903 model was shown for the first time in public. Other exhibitors were the Benz Company of Mannheim; the Cudell Company of Aachen, the de Diétrich German branch, the Opel Company, operating under Darracq license, and the Ruesselsheim Company.

Receptions at Garages.

The opening of a new automobile garage is now regarded in Paris as an event of public interest, writes "Automan," in *Motor Car Journal.* Invitations are issued and accepted by deputies, municipal councillors, military men, aristocrats and heads of large automobile factories. An orchestra is engaged, champagne flows freely and the manager of the new concern receives his guests with white kid glove covered hands, as if he were the President of the Republic receiving his citizens. Such was the scene last Saturday, when a new garage was inaugurated in the Avenue de la Grande Armée, and literally hundreds of people thronged to the opening, the visitors including the presidents of both the "Chambres Syndicales."

Motor cycles will not be allowed in the annual endurance run of the Automobile Club of Great Britain this year. They have competed together with automobiles in previous tests, but this year will be given separate trials.

RUBBER TIRE MAKERS REPORT SATISFACTORY TRADE CONDITIONS.

Special Correspondence.

AKRON, O., March 14.—The increasing demand for tires for motor cycles is attracting general attention in the rubber trade and indications are that by another year there will be need of giving them more attention than they have received in the past or are even now receiving. The number required now is relatively small and such is the rush in the automobile and vehicle tire departments that the trade of the motor cycle manufacturers has not been strongly solicited.

"Every tool at our command and all the molds we can obtain are being worked to their fullest capacity, and our machine shop is busy night as well as day to add to our equipment to take care of the tire business as it now stands," said a leading tire manufacturer, "and we shall not care if the motor cycle business does not claim a great deal of attention for a year to come."

LABOR SITUATION IN AKRON.

The labor situation in the rubber factories, happily, has adjusted itself so far as Akron is concerned and troubles in the rubber trade elsewhere have been settled. The Rubber Workers' Union will hold its national convention in this city in June and considerable of a demonstration is expected, other local unions joining together to assist in the entertainment of visitors. However, the wages paid at this time are more satisfactory than for a long time so far as Akron is concerned, and as long as workmen are busy and the factories running double time in this city there will be no great scarcity of tires. Moreover, as conditions are here they are likely to be the country over, for more rubber workers are employed here than in any other city in the world.

The incorporation of the Lilly Rubber Co. a fortnight ago and the starting of its factory makes 24 rubber concerns in Akron and its suburbs.

Talk of another advance in the prices of manufactured rubber which was heard a short time ago has practically disappeared. When a general advance, ranging from five to ten per cent., was made in January it was indicated that there would be another rise in April. The likelihood of this has disappeared. The crude gum market has been stronger of late but has only recovered the decline of a few weeks ago and is not higher now than when the price lists were changed about January 1.

Strikers Adopt the Automobile.

Special Correspondence.

NEW HAVEN, Conn., March 7.—The strike of the trolley men of the city of Waterbury, which has occasioned considerable bloodshed and disorder, is still in progress, and there is no prospect of its ending. The company is operating its cars with strike breakers. The strikers are running stages to compete with the cars, and so strong is the feeling among the work people that they ride in the stages, undergoing much inconvenience thereby.

The strikers are now making a move to introduce the automobile into rivalry with the trolley cars, to help them carry their point. They are arranging to purchase a steam wagonette from Hartford, which was made by the Mobile Co. of Tarrytown. The machine will seat 8 persons, and as it will make fast time it is expected that it will cut a prominent figure in the fight against the trolleys. If it works as well as it is expected, other automobiles will be put on.

Show Situation in Indianapolis.

Special Correspondence.

INDIANAPOLIS, Mar. 7.—If present plans of local dealers materialize, there will be more automobile gossip in Indianapolis during the first week in April than at any other time during the year.

It seems that the failure of the dealers to get together for a show this year is going to have a wholesome effect after all. Instead of one show there will be several, every dealer in the city making an effort to outdo the other during this week. When the Fisher Automobile Company announced that they would give a show regardless of the action of other dealers, and announced a list of attractions, each dealer had a little meeting of his own and decided that the thing to do was to fix up his place of business and have a little show of his own. D. B. Sullivan and S. E. Elston have announced that they will receive their friends during this week and will have a list of attractions to offer shortly. The Hearsy Company will also arrange for a show of some kind.

The fact that the dealers are just a trifle ruffled at one another on account of the failure to get together has engendered a spirit of rivalry which will doubtless result in three shows which will be all that energy and art can accomplish in this particular line.

Additional Factories in Cleveland.

Special Correspondence.

CLEVELAND, March 7.—The Kirk-Latty Manufacturing Company, of this city, has completed a very handsome touring car as the result of experiments that have been under way for some time. The power used is gasoline and the engine is of the double cylinder type, with some improvements over many now in use. The company will, after thoroughly testing this car on all kinds of roads, manufacture it on rather an extensive scale. This will add another concern to Cleveland's already large number of factories.

The manufacture of forgings for the automobile trade has also become a prominent factor in the business world of the Forest City, as is evidenced by the fact that the firm of Joseph Dyson & Sons, who already have an extensive plant, have been compelled to add another large building which will in a manner double the capacity. It will be 120 feet in length and a lot of new machinery will be installed as soon as it is completed. Lathes will be installed to do rough turning, so that their product may be delivered to the manufacturers in a very much better condition than in the past.

Exhibits at the Washington Show.

Special Correspondence.

WASHINGTON, D. C. March 7.—The automobile show to be held in the Washington Light Infantry Armory during the week of March 23, under the auspices of the Washington Automobile Dealers' Association, promises to be as big a success in proportion as the shows that have already been held in New York, Chicago, and elsewhere this year. Nearly every foot of space has been sold, and in point of number of exhibitors and variety of exhibits the show will undoubtedly be the greatest in the history of the local trade. A number of interesting events have been provided by the management, one of which will be a drill given in the exhibition hall each evening by a squad of men under Major Davison, from the Highland Park, Ill., Military Academy, who will come on for the occasion, bringing with them their famous automobile field gun.

Mass. A. C. May Move.

Special Correspondence.

BOSTON, March 9.—There are rumors that the Massachusetts Automobile Club will eventually move to a new building, to be built for it farther up Boylston Street, beyond Massachusetts Avenue and directly bordering on the park system. Its present house is much too small, as has been shown before in these letters, but it was thought until recently that the club would secure land adjacent to its present building, where it has an option, and make an addition suitable for its needs. The new move is expected to carry with it, if consummated, some plan for headquarters for the New England Automobile Association.

World's Kilometer Record Rejected.

On the Welbeck road in England, used by the British automobile club for speed trials, Hon. C. S. Rolls recently drove a Mors car fitted with a Serpollet aluminum, wind-breaking body over a properly measured kilometer in 27 seconds, lowering the record of Augière on the Dourdan road in France two seconds. The achievement was announced as a world record, but later cablegrams state that the French club refuses to sanction it as such, because the course was down grade and the wind was favorable.

CLUBS PLANS TOURS OVER PICKED ROADS—TRADE CHANGES.

Special Correspondence.

CLEVELAND, March 7.—The Automobile Club here is preparing for a number of meets and tours into various portions of the country. Northern Ohio is especially well adapated to touring, for there are many pikes built over the country and they are usually kept in such good repair that they make splendid roads for ordinary riding. There are no very steep grades and for the most part the roads are in fair condition. This may also be said of the central part of the State and, even in Southern Ohio, many pikes have been built through the hills that a machine may pass over at a good speed. A committee consisting of Walter C. Baker, Charles B. Shanks and Windsor T. White, has been appointed to arrange for the tours.

Cleveland people who visited the Chicago show were not very much impressed with the reception given the exhibition. The weather was extremely cold the greater part of the time, but the criticism made upon the management by most of those interested is that there was not enough local publicity given it to attract the people. One gentleman said that those who were there did not seem interested in the machines. As far as the show itself was concerned, it was a beautiful exhibition and well worthy of far more attention than it received.

The Woodruff Automobile Co., of Akron, is being organized and will in a short time be incorporated with an ample capital stock to put a large plant in operation. The plant so far has been operated by A. M. Woodruff and G. E. Woodruff with fair success. Several Akron capitalists have become interested in the company and will lend their aid.

WINTON'S CITY SALES ROOM.

The Winton Motor Carriage Company has opened its city salesrooms and storage house on Huron Street for business, and the stock is being put in as rapidly as possible. The first floor of the building will be used for offices and display pruposes. The second floor has a nicely furnished room in front which will likely be used for club gatherings and any other social matters that may come up. In the rear is another room which will be used for practice purposes or anything else for which it may be needed. The third floor will be used for storage and the fourth will contain a complete repair shop, with all the machinery necessary for that purpose. The power will be furnished by an electric motor. A huge elevator reaches all the floors.

A complete service will be furnished by this establishment. A wash-room will be kept in operation where machines will be cleaned up at any time. It will be open evenings and machines will be taken care of and sent to meet their owners after the close of the theaters. In addition machines will be collected and delivered after being repaired. A charging station will be maintained and it will be a complete garage in every way. Charles B. Shanks will be in charge of the sales department and will also continue as advertising manager. Roy S. Drake, an experienced newspaper man, is the assistant in the advertising and literary department and prepares a great deal of the matter that goes into the advertising, as well as that which goes to make up the private publication issued by the company.

MIDGLEY ANNUAL MEETING.

The annual meeting of the Midgley Manufacturing Co., of Columbus, was held a few days ago when the following directors were chosen: Thomas Midgley, Thomas K. Wissinger, Otto Engwerson, Daniel Krumm, Charles S. M. Krumm, J. O. Johnson, W. D. Hamilton, Charles S. Hamilton and N. M. Petersen. The officers elected are as follows: President, Thomas K. Wissinger; vice-president, W. D. Hamilton; secretary and treasurer, Otto Engwerson; general manager, Thomas Midgley. The company manufactures the Midgley tubular steel wheel for automobiles and carriages.

EXPERTS IN EVERY VILLAGE TO LICENSE MOTORISTS.

State Senator Daniel J. Riordan, of New York, and Assemblyman Joseph P. Bourke, of the same State, are making a paired attempt at patching the automobile legal situation by introducing a new bill in their respective branches of the legislature, at Albany. Riordan's bill has already been presented and provides for registry of every automobile with the Secretary of State, the fee to be $1, as before the Automobile Club's highway law went into disuse and the Cooks bill was passed, but instead of obtaining a simple certificate of registry giving his initials, the owner gets a document giving his registry number and a classification letter, the latter determined by the horse power of his vehicle. The letter and number must be displayed conspicuously at the rear of the vehicle.

Operators of automobiles must obtain a license from their local authorities, and to this end examining boards are to be established in every city, town and village, who shall probe the fitness of all who apply. The license fee shall also be $1. Operators must show their license when requested by a peace officer, and two violations of any existing automobile traffic laws or ordinance are to result in revoking the license of the guilty driver, aside from other penalties that may be inflicted.

Automobilist Defends His Rights.

Special Correspondence.

NEW HAVEN, Conn., March 9.—The outcome of the suit of Mrs. Kate E. Harrison vs. Joseph E. Sessions, which has just been brought in the Superior Court in Hartford County for $2,000 damages for alleged injuries received because of the manner in which the plaintiff handled an automobile, is bound to attract attention.

If the case is decided in favor of the plaintiff, automobilists who are familiar with it are wondering "where they will get off," as the defendant is one of the most careful drivers in the State, and in this matter is considered absolutely blameless.

Both the parties to the case live in Bristol. Mr. Sessions, who is a wealthy manufacturer, has owned a steam road carriage for some time, and is an expert handler of it. On the afternoon of a fine day last August he was riding on one of Bristol's streets, and being on a down grade, shut off his power. Turning into a side street he noticed a horse standing harnessed to a wagon in front of a store. The animal seemed frightened and Mr. Sessions ran his machine to one side of the road and stopped before there was any trouble.

Mrs. Harrison was in the wagon with another woman and a child. The horse began to plunge wildly and Mrs. Harrison gathered up the reins. The horse turned sharply around and finally upset the wagon, throwing the party out. Mrs. Harrison sustained a severe shock.

South Carolina Roads.

Special Correspondence.

CHARLESTON, S. C., March 7.—Through the efforts of the recently organized Commercial Club of this city, the subject of good roads in this section is being agitated to a considerable extent. The matter of building a boulevard from Charleston to Summerville, a distance of about 25 miles, will be the first project of the sort to be furthered by the club. Such a boulevard would be a great drawing card for northern tourists, as the Pine Forest Inn at Summerville is a favorite winter resort. The following committee has been appointed by the club to conduct the movement: H. P. Williams, chairman; J. H. Marshall, L. D. Simonds, F. W. Wagner, W. K. McDowell, E. F. Parker, L. P. Dotterer, J. W. Messervey, P. R. Rivers, A. R. Thomlinson, H. R. Ficken, John O'Connell, G. Y. Coleman, J. Alwyn Ball, W. R. Mayrat, J. H. Dough, J. H. Rast.

Automobiles Exports.

Special Correspondence.

Washington, D. C., March 7—The latest returns of the Treasury Department show that the exports of automobiles during the month of January were valued at $176,054, as against $238,551 for the same month last year. During the seven months ending January, the exports were valued at $602,999, as against $394,682 for the same period of 1901-02. An increase of nearly one-half in the value of exports during the periods mentioned is an encouraging record.

DATES OF SHOWS AND CONVENTIONS.

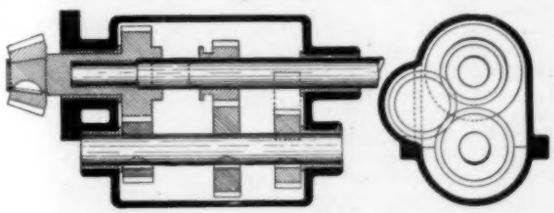
Mar. 9-14—Local Automobile Exhibition, City Convention Hall, Buffalo.
Mar. 16-21—Local Automobile Exhibition, Symphony Hall, Boston.
Mar. 23-28—Local Automobile Exhibition, Light Infantry Armory, Washington, D. C.

RACES—1903.

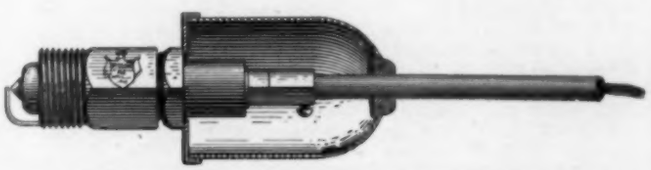
Mar. 26, 27, 28—Florida Race Meet—Ormonde-Daytona Course.
Apr. 11—Gordon Bennett Cup Trials New York.
May 24—Paris-Madrid Race.
July—Gordon Bennet Cup Race in Ireland.

INFORMATION FOR BUYERS.

COVERT MOTORETTE.—The Covert motorette and chainless automobile, as described in a catalogue for 1903 recently issued by the makers, the B. V. Covert Co., of Lockport, N. Y., are good examples of a type of machine which has been developed in this country in response to a popular demand. The motorette is a light affair weighing only 450 pounds, yet it will carry two passengers over ordinary roads at a speed of from five to 20 miles per hour and will ascend all grades up to 15 per cent. The Covert Chainless is a light touring car or runabout for two persons, being designed to meet the demand for a light and yet powerful automobile for touring over all sorts of roads. Aluminum is largely used in its construction, making it light and yet strong enough to stand all kinds of use. The motor is of the De Dion type, with water-cooled cylinder, and will develop about 5 horse power, brake test. The speed change is of the sliding gear pattern. Heavy wire wheels with steel rims fitted with 27-inch by 2 1-2-inch Dunlop Clincher tires are used.



CHANGE GEAR OF COVERT CHAINLESS CAR.



AMERICAN COIL CO.'S MARINE SPARKING PLUG.

COVERT MOTORETTE MADE IN LOCKPORT, N. Y.

SPARKING DYNAMOS.—A high degree of efficiency and durability is claimed by the Eldredge Electrical Manufacturing Co., of Eldredge, N. Y., for its type "R" sparking dynamos. Beside the usual features of such dynamos, the company claims especial excellence in the armature insulation and winding. After insulating and winding the armature is baked for three or four hours at 85 or 90 degrees centigrade to remove any moisture that may have been taken up by the insulating material during the process of winding. It is then dipped while still hot in Sterling Extra Insulating Varnish and allowed to remain in the vat as long as may be necessary for the varnish to penetrate every part of its insulation. This varnish is also a specialty of the company's, and a sample of it is enclosed with the bulletin describing the dynamo. Extreme flexibility, high insulation and oil and water resistance are among the virtues claimed for it.

MARINE SPARKING PLUG.—Special adaptation for marine work is claimed for the American covered sparking plug, manufactured by the American Coil Co., of West Somerville, Mass. This plug has a brass shell throughout and is supplied with a brass cover or hood which covers that part of the insulation which extends beyond the shell. This hood is fitted with a hard rubber bushing at its upper end, through which a rubber-covered flexible wire is carried, the rubber covering on the wire making a tight joint through the hard rubber. The hood is secured to the flange on the top of the plug with a bayonet joint. This construction prevents moisture or oil from bridging the insulation on the outside of the plug, as is often found to be the case with the ordinary plug, especially in an open boat, where a dash of water over the side is liable to cause a short circuit.

NORTH-WESTERN STORAGE BATTERIES.—T. L. Tincher, maker of the Tincher automobiles, writing to the North-Western Storage Battery Co., of Chicago, says of its batteries: "Your battery is a source of constant satisfaction to me. There seems to be no end to the life of even the first charge put into it, and to-day, after a great deal of hard usage, it has all the electricity I require for a four-cylinder engine. I believe it will run a machine a year without a recharge. I can heartily recommend it for automobile purposes. The company's general offices and factory are at 465-467 West Twenty-second Street, Chicago.

PEERLESS MOTOR CARS.—The Peerless Motor Car Co., of Cleveland, O., is establishing a New England branch at 178 Columbus Avenue, Boston, where deliveries will be made for all New England. A. E. Morrison, who has been sales manager for the company, will manage the branch. Mr. Morrison formerly represented the Rambler bicycles on the Pacific Coast for nine years, and later gained his experience with gasoline engines with the Waltham Manufacturing Co. He has also been connected with the International Motor Car Co., in Toledo, O.

CUDELL CHAINLESS.—Cudell & Co., of Aix la Chapelle, have issued a very attractive catalogue of their cars, which represent the latest development in German automobile manufacture. Runabouts, motorettes, touring cars, busses, surreys, breaks, cabs, racing cars, delivery vans and trucks, with horse power ranging from 3 1-2 to 60, are all included in the company's line of manufacture. The motors are of the one, two, four and eight cylinder types. J. C. Brandes, of 28 West Thirty-third Street, New York city, is the United States agent.

SPAULDING AUTOS IN NEW HANDS.—Nelson P. Baker will be manager for the Morlock Automobile Manufacturing Co., of Buffalo, N. Y., which has purchased the plant of the Spaulding Automobile and Motor Co. in that city. The new company will manufacture a light runabout, which will be exhibited at the Buffalo Automobile Show, March 9-14.

"THE LAUNCH."—This is the title of an attractive and interesting little quarterly magazine, published by the Truscott Boat Manufacturing Co., of St. Joseph, Mich., with publication offices at 455 Wabash Avenue, Chicago. It reached its second number with the March issue. It is devoted to stories and general information of interest to launch owners and no undue prominence is given to the company's own product.

Directory of American Automobile Clubs.

WITH NAMES AND ADDRESSES OF SECRETARIES.

AMERICAN AUTOMOBILE ASSOCIATION—S. M. Butler, 753 Fifth Avenue, New York.
AUTOMOBILE CLUB OF AMERICA—S. M. Butler, 753 Fifth Avenue, New York.
AMERICAN MOTOR LEAGUE—Frank A. Egan, 174 Broadway, New York.
ALBANY A. C.—Chas. M. Page, 99 Central Avenue, Albany, N. Y.
BERKSHIRE A. C.—L. A. Merchant, 86 North Street, Pittsfield, Mass.
BETHLEHEM A. C.—Wm. E. Martin, Bethlehem, Pa.
BLOOMSBURG A. C.—C. W. Funston, Bloomsburg, Pa.
A. C. OF BRIDGEPORT—F. W. Bolande, State Street, Bridgeport, Conn.
BRONX A. C.—F. M. Jeffries, Bronx Borough, New York City.
BUFFALO A. C.—John Satterfield, Prudential Bldg., Buffalo, N. Y.
A. C. OF CALIFORNIA—E. P. Brinegar, 415 Montgomery street, San Francisco, Cal.
CEDAR RAPIDS A. C.—Geo. Henderson, Cedar Rapids, Ia.
CHICAGO A. C.—Walter H. Chamberlin, 243 Michigan Avenue, Chicago.
A. C. OF CINCINNATI—L. S. Colter, 30 W. Seventh Street, Cincinnati, O.
CLEVELAND A. C.—Geo. Collister, Superior Street, Cleveland, O.
COLORADO A. C.—W. H. Bergtold, 624 Fourteenth Street, Denver, Col.
COLUMBIA UNIVERSITY A. C.—R. C. Gaige, Col. University, New York City.
COLUMBUS A. C.—Campbell Chittenden, Broad Street, Columbus, O.
COUNCIL BLUFFS A. C.—Tom S. Farnsworth, Council Bluffs, Iowa.
DAYTON A. C.—W. Webster Ensey, Dayton, Ohio.
A. C. OF DETROIT—W. S. Burtenshaw, Detroit, Mich.
GRAND RAPIDS A. C.—John T. Byrne, Michigan Trust Bldg., Grand Rapids, Mich.
HARTFORD A. C.—Walter G. Cowles, Box 426, Hartford, Conn.
HERKIMER A. C.—W. I. Taber, Herkimer, N. Y.
A. C. OF HUDSON COUNTY—Frank Eveland, Jersey City, N. J.
A. C. OF ILLINOIS—M. Scott, 1215 Marquette Bldg., Chicago, Ill.
A. C. OF INDIANA—J. A. McKim, Indianapolis, Ind.
A. C. OF KANSAS CITY—M. A. Albertson, Kansas City, Mo.
LONG ISLAND A. C.—Read Halliday, Lincoln Club, Long Island, N. Y.
A. C. OF MAINE—Chas. P. Hatch, Portland, Me.
A. C. OF MARLBOROUGH—J. F. J. Otterson, Marlborough, Mass.
A. C. OF MARYLAND—C. Warner Stork, Altamont Hotel, Baltimore, Md.
MASSACHUSETTS A. C.—F. L. D. Rust, 761 Boylston Street, Boston, Mass.
MILWAUKEE A. C.—W. J. Merkel, 1095 Twenty-sixth Avenue, Milwaukee, Wis.
A. C. OF MINNEAPOLIS—S. D. Andrews, Minneapolis, Minn.
MONMOUTH A. C.—Geo. W. Pittinger, Asbury Park, N. J.
NATIONAL CAPITAL A. C.—Erskine M. Sunderland, 819 Fourteenth Street, Washington, D. C.
A. C. OF NEW JERSEY—W. J. Stewart, 8 Central Avenue, Newark, N. J.
A. C. OF NEW ORLEANS—Sam Stone, Jr., Progressive Union, New Orleans, La.
NORTH JERSEY A. C.—Ed. T. Bell, Jr., Paterson, N. J.
NORTH SHORE A. C.—Quincy A. Shaw, Jr., Pride's Crossing, Mass.
PASADENA AUTOMOBILE CLUB.—J. T. Pugh, Pasadena, Cal.
A. C. OF PHILADELPHIA—Frank C. Lewin, 1404 S. Penn Square, Philadelphia, Pa.
RHODE ISLAND A. C.—H. H. Rice, Crown Hotel, Providence, R. I.
A. C. OF ROCHESTER—Frederick Sager, 16 State Street, Rochester, N. Y.
A. C. OF SAN JOSE—B. D. Merchant, San Jose, Cal.
A. C. OF SPRINGFIELD—F. A. Hubbard, Springfield, Mass.
A. C. OF ST. LOUIS—E. M. Senseney, 2829 Washington Avenue, St. Louis, Mo.
A. C. OF SYRACUSE—F. H. Elliott, 517 E. Water Street, Syracuse, N. Y.
TOLEDO AUTOMOBILE CLUB—Geo. A. Palmer, Toledo, Ohio.
TOPEKA A. C.—R. D. Montgomery, Topeka, Kan.
A. C. OF TRENTON—Edward S. Wood, Trenton, N. J.
TROY A. C.—J. S. Thiell, Troy, N. Y.
WORCESTER A. C.—H. E. Shiland, Worcester, Mass.

INFORMATION FOR BUYERS.

THOMAS MOTOR CO. SALES.—Sales of Thomas motor cars were made at the Chicago Automobile Show to the following Chicago people: U. W. Kelly, president of the Simplex Railway Appliance Co.; L. B. Doty, vice-president of the Pittsburg Coal Co.; D. Miller, first vice-president of the C., B. & Q. R. R.; Preston Gibson, T. W. Beck, C. A. Coey, S. W. Watkins, manager of the Christensen Engineering Co., and G. W. Norton. The company's Chicago agents are C. A. Coey & Co., at 5311 Cottage Grove Avenue.

ELECTRICAL INSTRUMENTS.—For the convenience of customers in New York city and vicinity, the Weston Electrical Instrument Co., of Waverly Park, N. J., has opened an office at 74 Cortlandt Street. There will be a show room in connection, in which will be exhibited the different types of Weston instruments. This company manufactures electrical measuring instruments of all kinds. Its New York office will be in charge of Caxton Brown.

BRAMPTON CHAINS.—Chas. E. Mills, of 97-99-101 Reade Street, New York City, sole United States agent for Brampton Bros., Limited, of Birmingham, Eng., manufacturers of automobile chains, has received a shipment of that company's product, to fit Panhard cars, and can now deliver from stock. He is also in a position to quote prices on chains to large manufacturers.

CHELSEA MFG. CO. REORGANIZED.—The Chelsea Manufacturing Co., of Chelsea, Mich., has been reorganized under the name of the Chelsea Manufacturing Co., Limited, with a capital of $200,000. The new company assumes the assets and liabilities of the old, and will follow the same lines as its predecessor, and in addition will manufacture the Welch automobiles.

NEW PURCHASING AGENT.—H. E. Walton, who has been connected with the Peerless Motor Car Co., of Cleveland, O., as its purchasing agent, has entered the employ of the Shelby Motor Car.

STORAGE BATTERY.—J. R. McMillan, the inventor of the storage battery manufactured by the Northwestern Storage Battery Co., has sold out his interests to the Knapp Bros., who will continue the business. Mr. McMillan is developing a number of new things in the electrical line and will organize a company to put the same on the market.

"BANN-AUTO" WHEELS.—Perfection in automobile wheels is claimed by the Muncie Wheel and Jobbing Company, of Muncie, Ind., for its "Bann-Auto" wheel, which is declared to be the only perfect traction wood wheel in existence. By a system of integral lugs or rings in the flanges the adjustment of the wheel or hub to any style of axle is made possible. Another feature is the strength secured by a long tenon and miter in the wood hub and a double row of rivets and bolts holding and supporting the hub in the flanges. The wheel can be fitted to either ball or roller bearings.

RELIANCE LOW WATER ALARM.—Positive action in alarming the operator is claimed for this alarm, which is manufactured by the Reliance Gauge Column Co., of Cleveland, O. The alarm is given by means of a whistle when the water in the boiler falls below a certain point. The appliance is tested to over 400 pounds pressure. It has recently been adopted by the Jackson Automobile Co.

KNOXMOBILE PLANT.—The Knox Automobile Co., of Springfield, Mass., makers of the Knox air-cooled motor wagons, has now entered its new plant, which increases its floor space and manufacturing capacity about five-fold. The plant now includes two acres of floor space, three elevators, a 28-station telephone exchange and a complete equipment of improved machinery.

KNOX AGENCY MOVED.—The agency of the Knox Automobile Co., in New York city, managed by C. H. Martin and H. M. Davis, has been removed from 152 West Thirty-eighth Street to 146 West Thirty-ninth Street.

ASBESTOS AUTO HOUSES.—One of the novelties at the Philadelphia show was the exhibit of asbestos automobile houses. They are portable and fireproof, and are shipped from the makers in sections, the only tools needed for their erection being a monkey wrench and a screw driver. The framework is of angle iron, and the covering of asbestos building lumber, something never before put on the market. The houses are manufactured by the Keasbey & Mattison Co., of Ambler, Pa., who hold the exclusive right to the patents.

STORING GASOLINE.—Safety, convenience and economy in storing gasoline is claimed for the Bowser Long Distance Gasoline Storage outfit, manufactured by D. F. Bowser & Co., of Fort Wayne, Ind. The makers declare that automobilists using this fuel may store any amount and pump it anywhere convenient without loss or danger from vaporization.

MOHAWK BICYCLES.—Although the Mohawk Cycle Company, of Indianapolis, has entered the manufacture of gasoline automobiles, it is continuing the manufacture of bicycles.

PHILADELPHIA BALL BEARING COMPANY.—The Philadelphia Ball Bearing Co. issues the following statement: "The Ball Bearing Co., of Philadelphia, Pa., state that they are the original concern under that name formerly located at Boston, and that they hold the business, patents and trade marks of that company, and alone have the right to the benefit of its name, experience and reputation."